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REPORT OF THE

Secretary of Agriculture

1944

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U. S. DEPARTMENT OF AGRICULTURE

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REPORT OF THE

Secretary of Agriculture

1944

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1944

WASHINGTON, DECEMBER 1, 1944

To the President

AGRICULTURE LOOKS TOWARD WINNING THE PEACE

It is necessary in wartime to prepare for peace, just as heretofore it has been necessary in peacetime to prepare for war. The best preparation for peace is victory. Hence the task of farmers and agricultural agencies during the war years has been to provide for our fighters, our civilians, and our allies. As the record shows, the result has been equal to the showing in any other branch of the national war activity.

Properly and indeed imperatively, however, preparation for the peace extends beyond the job of making sure that with our allies we shall be able to dictate the terms. It includes planning for the change-over. Such planning has immediate as well as prospective value. It lessens worry over peace problems, with the result that people do a better war job. In addition, it smoothes the way for peacetime readjustments.

Farmers and farm agencies have therefore done some post-war planning from the very beginning of the war effort. As the victory draws nearer they give more and more attention to the problem. Partial readjustment will be in order as soon as Germany has been defeated. Obviously, even if the war with Japan continues for months or longer after the elimination of Germany, it will not then require the vast production that was necessary when we also had Germany and all its satellites to beat. With each advance of the allied forces, the tempo of the peace-planning must advance, lest when the war is over, the country fall into the pit it fell into after World War I. In justice to farmers, and also in the interests of our whole population, we must have an adequate and sound post-war program, based from the agricultural point of view on the fact that agriculture's welfare is inseparable from the welfare of the country as a whole, which in turn depends greatly on the condition of industry, agriculture, and trade throughout the world.

Over many handicaps American farmers and ranchmen have produced more food during World War II than any nation ever produced

before in an equal time. They have made it possible for us to have the best fed Army and Navy in the world; they have supplied all essential civilian needs; they have provided vast quantities of food for our allies. In the last year, for example, the War Food Administration has purchased an average of more than 8 million dollars' worth of food per day, mostly for lend-lease shipments. This production, as our allies have themselves declared, has been of vital importance in the United Nations' war effort. Such production is what we want and shall continue to want when the war is over. It is plain common sense to produce all we can consume and export without injuring our soil and without forcing producers' prices below a fair-profit level.

Employment Basis for Farm Production

Large farm production can be continued, however, only if we have all-out industrial production as well. If industrial production falls, agricultural production must decline also. Industry and agriculture furnish a market for each other, the size of which depends on the degree of their activity. Abundant wartime farm production has been facilitated by the support prices that Congress has provided. Funds and authority will be necessary, when the war is over, both to maintain the support prices and to handle surplus-disposal operations, because naturally we shall have surplus stocks of food just as we shall have surplus airplanes, tanks, and guns. Some of these food supplies will be wanted for temporary relief abroad. In addition, this Nation will need authority to sell accumulated stocks abroad at prices that will meet those asked by other food-exporting countries. Mainly, however, the farmers' post-war market will depend on employment and consumer buying power in the United States.

Post-war planning in this Department has centered in an interbureau committee that was established before we got into the war. Representatives of the land-grant colleges have worked with this committee, though subcommittees of field representatives. The central problem, as the cooperating groups see it, is how to make good use, when the war is over, of the Nation's prodigious farm production capacity, which will increase as additional labor, machinery, equipment, and fertilizer become available. If uses can be found for this production capacity, other aspects of the farm problem, though serious, will be manageable. If we should fall far short of using what the farmer can turn out, the prospect for agriculture and for the whole economy will be dark. Our people and the people of other countries will need what our farmers can produce. But will the effective demand be sufficient? Will need and buying power match? How to maintain consumer buying power is the main problem.

It is easy enough to state the requirements, but fulfilling them is another story. The first and most important, namely, full employment in this country at fair wages and salaries, has been mentioned. In the past our farmers have sometimes not realized their dependence on nonfarm employment, wages, and consumer incomes. They realize it now because events both of the war period and of the years that preceded the war have established the connection clearly. The non-

farmer is adequately the farmer's customer only if he has ample buying power. Otherwise he is in some degree the farmer's dependent, since with consumer buying power scanty the farmer must sell crops at a loss. Thus agriculture becomes the national shock absorber and in a sense the main provider of relief. Even full domestic employment, however, will not in itself provide a sufficient agricultural market at the current level of farm production. Full employment will absorb only the output of an acreage considerably reduced from that of the war years.

Maintaining Post-War Demand

Hence, in addition to full employment, capacity production in agriculture requires that low-income families shall have help in obtaining more food and more textile products. Under present income patterns, even full employment will leave millions of families without money enough for their essential needs. Government programs should be provided to increase the consumption of food and clothing by these low-income families. Food-stamp, school-lunch, and similar programs can serve a double purpose; such programs can help to keep our farm plant running and at the same time can improve the standard of nutrition and clothing where it is low. Even with such programs added to full employment, the demand for farm products will still not fully equal the country's farm production capacity. In the war years we have been providing foods and other farm products to our allies as well as to our own armed forces and civilians. After the war, therefore, we shall need a substitute for the lend-lease shipments; otherwise, agriculture's export acreage will have to be reduced.

This means, of course, that we must have considerable farm export trade, not merely for world relief purposes but on a permanent commercial basis. It can be achieved only as part of a broad international program. As recent experience has shown, the problem is full of complexities. Our own situation, which is typical, has counterparts in many other countries, and reveals possible causes of a deadlock. Theoretically, no nation can maintain a profitable flow of exports if it shuts its doors to imports. Practically, however, what to take in exchange is always a difficult and often highly controversial matter, the handling of which requires both wise and equitable internal readjustments and carefully worked-out arrangements with foreign countries. Frequently, also, it necessitates extensive credit operations. It should be borne in mind, too, that the United States has raised its farm prices considerably above their normal world relationship, and will have to do something to correct the disparity if it expects to develop farm export trade in any volume when the war is over.

Perhaps the most promising long-term solution of the export problem will be found in cooperation among exporting and importing countries, with the twofold object of increasing world consumption and assuring each exporting nation of its fair share of world markets. This country will need to plan carefully the type of imports it wants and needs so that it will not have to accept whatever may be offered. In export trade, competing for world markets at world prices will help keep the farmers of this country on an equal footing in the world

market with farmers of other countries. But the dumping of agricultural products on foreign markets, at any price that will get rid of them, would not be a workable long-time means of getting export trade. Dumping leads to retaliation, and to new and more restrictive trade barriers. As an example of the better type of action that might be developed, we have the international wheat agreement, which could be a model for world agreements in regard to many commodities.

Analysis of agriculture's post-war problem by the Department's interbureau committee and the affiliated State groups has produced some recommendations. Some shifting among crops and livestock products will be necessary even if we maintain full employment. The Ever-Normal Granary should be expanded as a means both of storing surpluses in years of plenty and of stabilizing farm incomes. Parity prices for farm products should be maintained, with increased flexibility in the application of the principle, along with special arrangements for export trade. Programs should be developed for improving public services and facilities for rural people, such as housing, health services and hospitals, schools, and rural electrification. Attention should be given to the development of a social security program for farm workers and farm operators.

Long-Time Farm Needs

Assistance of various kinds should be provided for small farmers, many of whom produce very little for sale. Some of them need technical advice; others need help in climbing up the ladder from tenancy to ownership; others need facilities for getting part-time nonfarm jobs. In many instances farmers without enough land can be assisted to get more land through farm-unit reorganizations and the provision of credit facilities. Price protection, we should remember, means little to farmers who market only small quantities of products.

Many old and some new problems in land utilization demand attention. Action is overdue on certain farm-tenure problems, and also with regard to farm housing. Programs will be needed to finance the purchase of family-sized farms, with special provision for returning soldiers. Considerable farm land, which ranges from submarginal to excellent, has been acquired by the Government for war purposes. It should be disposed of in line with policies that Congress has developed over a period of years. Submarginal land, for example, should not be sold to individuals for farming purposes, but usually should be assigned to Federal or State agencies for forestry, park development, range restoration, or other conservation programs. So far as possible, land suitable for farming should be divided into family-sized units and sold only to persons who intend to live on and operate it. Land suitable only for range purposes should be sold in tracts consistent with that use.

Former owners should be given a reasonable period, say about 90 days, in which to repurchase the land they formerly owned, at a price not exceeding the price which the Government paid, with adjustments either for damage or for improvements to the property. Subject to this prior claim, former tenants, and war veterans who have had experience in farming should be given an opportunity to acquire

farm units. As long as former owners, former tenants, and service men are anxious to obtain farms at reasonable prices and terms, land released by the Government should be made available to such persons. It should not be allowed to fall into the hands of persons who do not need it for homes, but should be used to encourage the family-sized, family-operated farm ideal of America.

Soil conservation and soil building practices will need to be increased when the war is over. This Nation, according to the Soil Conservation Service, has ruined more land in less time than any other nation did. More than 50 million formerly cultivated and fertile acres no longer produce crops. It may be possible for farmers to use surplus war equipment in the soil conservation job. Track-type tractors, bulldozers, ditching, and other similar machinery will be available in large quantities, much of it suitable or adaptable for constructing terraces, drainage and irrigation ditches, stock-watering ponds, and other conservation facilities. The numerous soil conservation districts that have been organized under State laws, as well as farmers individually, may be in the position to purchase such equipment, the use of which will result in more and better conservation work.

Uses for Engineering and Technical Ability

After the war this country will have more engineering and technical ability available than ever before. It should use this power in protecting and restoring natural resources, in constructing dams for irrigation, in flood-control operations, and in hydroelectric developments. The field is still wide for rural electrification, which makes farm life easier, more productive, and more comfortable. Engineering and technical ability will be available also to decentralize industry and develop it more uniformly throughout the country so as to bring raw materials closer to processing plants, and to multiply local contacts between agriculture and industry. Additional highway construction will facilitate the interchange of field and factory products. The further development of rail and air transportation can be expected to have great beneficial effects. Air transport particularly may be of enormous significance. For example, combined with improved refrigeration, it may greatly widen the marketing range for perishables.

Many other agricultural needs should be kept in mind. Further efforts must be made to put low-yielding and submarginal lands into suitable uses. Our forests, which under war conditions have been further depleted, must have the benefit of proper harvesting, adequate planting, modern cultural and other methods, and must have increased protection against fires, disease, and insects. Potential farm land should be made productive through irrigation, drainage, or clearing, although we shall not need any substantial increase in the total of our cropland, and agriculture will not have room in it for large numbers of returning veterans and former war-plant workers. There is a big field for necessary improvements in marketing facilities. Later sections of this report will deal in more detail with both the farm readjustment problem in its broader aspects and with important special aspects of it.

MAIN PROBLEMS IN AGRICULTURAL RECONVERSION

Under the stimulus of the war our agriculture has demonstrated a tremendous capacity to produce. In 1944, for example, our estimated total agricultural production was 33 percent above the average for the period 1935–39, and our estimated total food production 36 percent greater. Agriculture achieved this record-breaking output with the smallest average number of persons working on farms in the whole 35-year period for which we have farm-employment estimates. It did so, moreover, against the handicap of shortage in machinery, fertilizer, and other agricultural supplies.

When this war ends in Europe our agricultural plant will be geared to produce, with normal weather, about one-third more than it produced on an average in the pre-war years. It could easily go higher. It will have more land, labor, machinery, and technology available with which within a short term of years it might produce up to 50 percent more than it did before the war. As a gage of agriculture's productivity, we may note that it has supplied vast quantities of food for our fighting forces and our allies, and also increased quantities for civilian consumption within the United States.

Farmers want to continue producing at high levels; they want to avoid any return to crop-restriction programs. Peace, however, will almost surely bring some decline in the demand for agricultural products. In the absence of vigorous measures to prevent such a misfortune, peace could bring a severe decline in the demand. It is imperative, therefore, to find substitutes for the war-induced demand. As a means of showing the nature of this problem and indicating possible approaches to the solution of it, the Department has analyzed the outlook broadly and also crop by crop, on the basis of an optimistic or full-employment assumption for 1950. The analysis, it should be noted, is not a forecast. No one knows what degree of employment we shall have in the early post-war years.

Given full employment and prices about equal to those prevailing in 1943 and 1944, a national income of about 150 billion dollars would be expected. This is slightly under the estimated income for 1944; slightly over that for 1943. With such a situation and a return to normal trade conditions over the world, it appears likely that cash income from sales of farm commodities would run about 16.5 billion dollars and that farm prices would about average the parity level. Actually, farm prices have averaged about 115 percent of parity and cash sales of farm commodities have run over 19 billion dollars in both 1943 and 1944.

Farm Outlook Geared to Employment

Even on the full-employment assumption, the outlook is for less favorable agricultural conditions than those of 1943. With unemployment, the outlook would be worse. Hence the agricultural analysis requires alternative assumptions as to the employment level. If, on a rather extreme assumption, the national income should fall to 60

billion dollars and if 15 or more million of our workers should be unemployed, agricultural prices might drop to 60 percent of parity, and cash sales of agricultural commodities to possibly 6.5 billion dollars.

Consider the implications of a less extreme assumption. What would happen should about 7 million out of an estimated 60 million workers be unable to find jobs? This number would represent about the same proportion of the total labor force as was unemployed in 1940. Under such conditions, the general price level would fall considerably below the level assumed for full employment.

With 7 million unemployed and prices generally down to or near those prevailing in 1941, the national income would be only about 105 billion dollars—45 billions, or 30 percent, less than under full employment. Farm prices would be down to about 90 percent of parity; cash sales of farm commodities would drop to about 12 billion dollars. But net farm income would be only two-thirds of what it would be under full employment, somewhere around 7 billion dollars, as compared with something over 10 billions under full employment. Nevertheless, such a condition would still be one of relative prosperity as compared with a catastrophically severe post-war depression, with above 15 million workers unemployed, with the national income down to 60 billion or less, and with a net income to farmers from farming of about 3.5 billion dollars.

As mentioned, therefore, the analysis based on the full-employment assumption is not a forecast, and it may be remarked also that it does not constitute a body of recommendations as to what agriculture and the country should or should not do. The decisions as to that are up to the people as a whole; they involve nonfarm as well as farm views and interests. The Department believes, nevertheless, that its investigations will help farm people and others to understand some choices that lie open, and will facilitate a reckoning of the costs and drawbacks that will be involved in anything we undertake. These we must balance against expected gains, so that we may more surely choose the path that offers the greatest net advantage, under conditions either of full employment or of some degree of unemployment.

It is not essential that assumptions used in trying to look ahead should be fully probable; their purpose is simply to provide a basis for tentative conclusions. Anyone may decide for himself as to whether the assumptions adopted are optimistic or pessimistic, and may modify the implications in line with whatever basis he himself adopts. Even if we run into a post-war depression, the analysis based on the full-employment assumption will have value, since it will help to show what is missing in the economic situation and, consequently, what must be supplied to make it yield prosperity.

Elements of Full-Employment Assumption

Main elements of the full-employment assumption are: (1) Full employment; (2) a national income maintained at about 150 billion dollars; (3) a general price level about the same as that of 1943; (4) farm prices somewhat below that level; (5) total imports in about the

same relation to the national income as imports were to the national income in pre-war years; (6) agricultural imports smaller in relation to total imports than before the war; and (7) agricultural exports reduced to about one-sixth of the total exports, as compared with one-fourth in the period 1935–39.

As the Department uses the term, "full employment" means a condition in which there will be a job available for every worker who is able and willing to work. It supposes that the working force will be employed at various tasks in roughly the same proportions as before the war and that similar standards will prevail with respect to hours and working conditions. On any given day, some workers will be temporarily unemployed, either because their work is seasonal, because they are on vacation, or because they are changing from one job to another. This temporary unemployment, the so-called frictional unemployment, may average 2 million workers. Only with some larger number inactive will it be correct to speak of true unemployment.

The assumed national income of 150 billion dollars presupposes that 55½ million persons (exclusive of those in the armed services) will be working full time in say 1950, by which time reconversions will presumably have been completed—8 million in agriculture and 47½ million in nonagricultural employment. To produce the bill of goods necessary to make up the 150-billion-dollar national income, all of the available laboring force, except the persons "frictionally" unemployed, must be at work. "Excess" farm workers will have been transferred into industrial employment. Not only will jobs be waiting for those individuals in industry, but they will be filling those jobs. Otherwise, the national income will not reach the 150-billion figure.

Changed Production Pattern Indicated

It follows, of course, that the farm production pattern would not be the same as it was in the war years. Full employment in 1950 does not mean the status quo of 1943 either for agriculture or for industry. For example, total demand for goods and services in 1950, as estimated in the Department's analysis, would be less in terms of food and fiber, and greater in terms of consumer durables and semi-durables. Hence, we would not be seeking means for maintaining acreages at the 1944 level, or means for holding surplus farm laborers on the farm. On the contrary, we would be promoting population shifts that would distribute manpower where it could produce things required, rather than things that must be stored or sold at bargain prices.

Total production of goods and services would need to be about 188 billion dollars in order to yield 150 billions of national income in 1950. This 188 billions would be roughly the value at 1943 prices of the work done in fields and factories by 55½ million workers at a rate of output per worker commensurate with pre-war trends. It would not exceed what a smaller labor force produced in 1943. In 1950, however, work schedules would include less overtime, and the production would not include numerous expensive war goods. Reck-

oning the net national income requires certain deductions from the value of the gross national product, notably deductions for business taxes and for the value of capital goods worn out. Statisticians usually estimate the national income at about 80 percent of the gross national product. This basis gives 150 billions for 1950 under the assumed conditions.

Price and Foreign Trade Implications

Two assumptions which the Department makes with regard to prices, namely, that the general level would be that of 1943 and that farm prices would be somewhat lower, go together. As to the general price level, the assumption is that consumer buying power would hold it up. As to farm prices, we have to allow for the fact that 1943 was a war year; farm prices then were above normal in their relation to wholesale prices for other commodities and the cost of living, or prices at retail for goods and services used by farm and nonfarm people. Probably in 1950, if for the purpose of this analysis we ignore possible price-support action, they would tend to be more closely in line with "normal" peacetime relationships.

They might be at about 160 percent of the 1910–14 level, as compared with about 193 percent in 1943; in other words, the general level of farm prices in 1950 might be at about parity, as compared with 19 percent above parity in 1943. This estimate allows for the probability that the prices of particular commodities may be affected in special ways, such as by long-run trends, by the prices of competing commodities, and by conditions in foreign markets. But domestic consumption, the chief price-supporting influence, would probably be substantially higher for most agricultural commodities than it was in the immediate pre-war years or even in 1941. In these years labor was not fully employed, and the national income was far below 150 billion dollars.

Estimates of post-war demand require allowances for imports and exports. In between the world wars our agricultural imports averaged about 50 percent of all imports, and changes in the imports closely followed changes in our national income. On the basis of this relationship, with some allowance for altered conditions, we may expect our total annual imports of agricultural products after this war to run about 2½ billion dollars with the national income maintained at 150 billion dollars. Naturally, the imports will consist largely of commodities our own farmers do not produce, such as coffee and bananas.

Possibly, however, the agricultural proportion of the total imports in 1950 may be less than 50 percent. The war has drawn heavily on some of our resources, particularly copper, lead, zinc, the best grades of iron ore, and petroleum, and we may want to replenish the supply through imports. Moreover, the trend away from silk, an important pre-war import, may continue. Then, too, the United States may be less dependent on imported rubber and fats and oils. These and other possibilities suggest that 2 billion dollars is a sufficient provisional estimate for agricultural imports as of 1950.

Reckoning Possible Exports

In reckoning possible exports the main item is foreign purchasing power, which depends largely on the number of American dollars our foreign customers have. Their principal sources are the payments we make for various commercial services, for the goods and services which Americans consume when they are abroad, and for our imports. Heretofore, our visible imports have constituted the largest source of dollars for foreign countries. After the war we may resume foreign lending. Many countries will need to rebuild their farms and factories; other countries may want to increase the pace of their industrial and agricultural development. As a possible supplier of necessary capital, the United States would furnish some dollar exchange to foreigners through investment channels. Figuring these things together, along with other influences that may shape our foreign trade, the Department estimates that in 1950 foreigners will have possibly 9 billion dollars available for the purchase of American goods and services.

What will they do with this 9 billion dollars? In the 20-year period 1919–39 foreigners bought American goods with 68 percent of the total payments which they made to this country. If this proportion holds in 1950, their total purchases of American merchandise would amount to slightly over 6 billion dollars. This sum, in other words, would express the value of our visible exports, and compares with a total value of exports of 4.8 billion dollars annually in the period 1925–39, and of 3 billion dollars annually in the period 1935–39. What proportion of the exports would tend to be agricultural? Again the appeal is to the record of the past. Our agricultural exports averaged 37 percent of our total exports in the period 1925–29, but in the period 1935–39 the proportion was only 25 percent. Possibly the pre-war trend will be resumed, in which event our agricultural exports may decline to about one-sixth of the value of our total exports. On this basis the agricultural exports of 1950 would amount to about 1 billion dollars.

The conditions assumed for 1950 suggest that our exports of fats and oils, particularly of lard, may be above the 1935–39 levels. Exports of citrus and other fruits may increase. Exports of meat and dairy products may not show much change from the 1935–39 average, although they would remain considerably below the averages for 1925–29. The outlook for cotton, wheat, and some types of tobacco—our principal agricultural exports in the past—is less favorable than for the above-mentioned commodities. In fact, cotton exports would run only 3.5 million bales a year if the pre-war down trend is projected into 1950. Much would depend, however, on our trade and price policies. These estimates, it should again be noted, assume that the pre-war trends would be resumed. Favorable changes in world trade practices could improve the prospect.

Consumption in the Domestic Market

When labor is fully employed, and business activity and national income are high, domestic consumers purchase larger quantities of agricultural products in general and substantially larger quantities of milk, meat, and fruits. Consumption of farm products under full

employment after the war, however, would not be the same as it was in the war years. Some changes would take place in the nature of the demand. How much of what farm products would be consumed domestically, under the assumed pattern of employment, prices, and national income, is therefore a complicated question. The Department's investigations indicate, however, that with the exception of potatoes and sweetpotatoes, certain cereals, and dry peas, our per capita consumption of all the major agricultural products should be higher under full employment in 1950 than it was in the pre-war period 1935–39, or even in 1941.

It is estimated that our population in 1950 will be about 144 millions. On this basis the per capita consumption estimates indicate a total domestic consumption of dairy products, in terms of milk equivalent, of about 129 billion pounds. This would be 11 billion pounds above the total production of 1943, in which year we exported a large quantity. Under full employment the domestic consumption of cotton and tobacco would rise well above the pre-war level and would leave comparatively small surpluses for export. In fact, exportable surpluses of these crops, if the production were no larger than in 1943, would be below the pre-war 5-year (1935–39) average. Our consumption of sugar in 1950 under the assumed conditions would necessitate either an increase in our sugar imports or an increase in our domestic production. On the other hand, the domestic consumption of dried beans, potatoes, sweetpotatoes, and eggs would be below the 1943 production, much of which was produced for use of the armed forces or for lend-lease shipment. The above-mentioned items are simply illustrative.

Approximately full employment in 1950 at the 1943 general price level would give a domestic and foreign demand for a total farm output not greatly different from that of 1943. The resulting cash sales of agricultural commodities would amount to 16 or 17 billion dollars, as compared with slightly over 19 billion dollars in 1943. It would take some serious planning, however, to assure the desired level of activity—planning both on the domestic front and in cooperation with other nations, and even then it would be necessary for agriculture to make important readjustments. Should full employment not be achieved, necessary farm adjustments would be more drastic.

In a depression, consumer purchasing power would fall precipitously, and the consumption of agricultural products would decline also—even at the lower prices that would then prevail. It might well fall particularly in meats, dairy and poultry products, fruits and vegetables, cotton, and tobacco. Consumption of cereals, potatoes, dry beans, and peas, which tend to be cheap per unit of weight, might not decline relatively as much. Although agricultural prices and incomes would decline, agricultural production would not decline proportionately. Experience teaches us, in fact, that agricultural production as a whole would not decline significantly, and farmers would be plunged once more into problems of surplus control.

Adjustments for Farm Efficiency

Moreover, farm efficiency is rising; output per acre, per animal unit, and per agricultural worker should increase substantially in the post-

war years. By 1950 average crop yields may be about 10 to 12 percent above pre-war averages, through wider use of known and available improved varieties and strains of seeds, better rotations and conservation practices, increased use of fertilizer, better control of insects and disease, and better timing in planting and harvesting operations. There may be an increase of about 5 percent in milk production per cow and in egg production per hen, and an over-all increase of possibly 2½ percent in the efficiency with which feed is utilized by livestock. Allowance for such improvements in farm technology indicates that, with full employment, production requirements for 1950 could be met by the cultivation of about 330 million acres of cropland, or about 25 million less than the acreage in cultivation in 1943 and 1944. With less than full employment, the acreage needed would of course be smaller.

The Department considers two possible production patterns for 1950—one with technology improved and one with technology not improved above the pre-war level. By the first pattern, the one that presupposes the efficiency incentives of full employment, relatively high prices, and large national income, the acreage necessary to produce the estimated 1950 requirements would be substantially less than that of 1943. Under the second pattern, the acreage required would exceed that of 1943.

Under the advanced technology pattern, necessary downward acreage adjustments would be considerable, especially if the war ends with an acreage considerably above that of 1943. It would be possible with improved technology for farmers to satisfy the production requirements of 1950 by cultivating only about 330 million acres of cropland, or 25 million acres less than in 1943.

The other production pattern, the one that assumes "average" technology, or technology no better than that of the pre-war years, would require perhaps 15 million acres more than the farmers cultivated in 1943. It would be necessary under this pattern to have more acreage in wheat, tame hay, sugarcane, sugar beets, vegetables, cotton, tobacco, and fruits. Offsetting adjustments would take place in potatoes, sweetpotatoes, dry beans and peas, and oil crops.

Technology could improve at an even faster rate than it did before the war. It would not be in the general interest, of course, to slow down or to halt the technological progress of agriculture. Some economic purists may say that the remedy for any surplus problems that this situation might create is to let prices decline. As we have noted, however, low prices are not a sure cure for surpluses. Experience indicates, moreover, that the level to which prices would have to fall might be lower than would be either acceptable to farmers or socially desirable. It is therefore imperative to develop alternatives to the low-price solution.

Improving Diets in Low Income Groups

One possible alternative is a Government program along the lines of the food-stamp and school-lunch plans, to improve the diets of the people in the lower-income brackets and of school children generally. Even with a national income of 150 billion dollars, large numbers of

people in the United States would still be inadequately fed. Suppose we had a program that would apply only to families whose annual incomes averaged less than $1,500. It would take substantial additional quantities of many foods to raise the diet of these families to an adequate level. In terms of cropland, such a program would require several million additional acres. It would help to keep the farm plant running and at the same time would improve the national nutrition.

Need of World Collaboration

Another alternative is a vigorous effort to develop a large export trade. This would require a high degree of world collaboration. Our crop acreage and our farm labor could be kept fully employed under improved technology only if we have the kind of international policy which the Hot Springs Conference outlined. This presupposes radical changes in foreign trade policies, tariff policies, and international currency programs, along with greater willingness on the part of the United States to accept imports. It supposes, too, that this country may have to export as much as 4 billion dollars of American capital annually in various forms of credits, loans, and investments. Such an investment policy, which would help temporarily to balance international payments, would also cause United States exports to rise. They wouldn't have to be primarily agricultural. Greater export trade in factory goods would benefit farmers.

Eventually, if we should engage in heavy foreign lending, we would face the problem of how to accept repayment on the due dates; in other words, the problem of how to digest the imports which the foreign lending will breed. Admittedly, this is a tough problem; but other countries have found ways to solve it, notably Great Britain, which for decades now has had more imports than exports, as the culmination of a long period wherein the British invested capital all over the world. This foreign investment, it should be noted, came in handy to the British in two world wars. It would seem that the United States likewise need not hesitate to assume the obligations of a creditor country and establish an appropriate trading policy.

THE FOREIGN TRADE PROBLEM

American agriculture has always depended to some extent on foreign markets. Naturally, this dependence has varied among different farm commodities. In recent years cotton, wheat, lard, tobacco, grain, and fruit have been most dependent on the export market. After the war we may again have to face a difficult problem in handling export surpluses. In fact, the problem may be aggravated by the fact that during the war we have become an important exporter of some items, such as dairy and poultry products, which before the war we did not export to any great extent. On the other hand, our production of certain other items, such as wool and sugar, will continue to be unequal to our national needs, and with respect to these we shall still have import-policy problems.

What principal conditions, national and international, will affect our post-war foreign trade in agricultural commodities? One of these

will be the existence of our agricultural price-support program. This report deals with the price supports in another section; here it will suffice to mention how they affect exports and imports. Price-supporting programs, whether in the form of loans or Government purchases or in any other form, have the unavoidable result of putting the Federal Government into a position of responsibility for foreign trade. This is because price supports, if they are to serve their purpose, will on occasion be higher than the prices at which other countries are prepared to sell the same or similar goods in foreign markets. Hence in dealing with products of which we have exportable supplies, the Government must act to make export supplies available on a competitive basis in foreign markets. Otherwise, export trade in these products will stop. Briefly, the price-support system obliges the Nation to adopt some kind of two-price system. Such devices, it should be noted, are difficult to shape and handle so as to obviate economic conflicts in international trade.

Moreover, the existence of a price-support system also affects the Nation's import policy. It cannot be applied, of course, to the products of the entire world. Hence it must include some positive and effective restriction on imports, so that lower priced foreign commodities will not flow in under the attraction of price supports. In the absence of effective import restrictions, foreign products would be consumed in the United States, while the domestic production would go into Government storage. In short, the price-support system can work only within barriers against world competition. It requires Government action with regard to both outgoing and incoming goods. Under a Government price-supporting system some restrictions on imports will be required from time to time, and there is no way under that system altogether to avoid Government intervention in the export trade, except through the drastic alternative of production control to reduce export supplies, accompanied by heavy accumulation of Government stocks. Eventually, the stocks would have to be disposed of through internal dumping or destruction.

Foreign Governmental Policies

Another important general condition that will affect our foreign trade in post-war years will be the existence of foreign governmental trade controls. Such controls will develop chiefly for two reasons. In the first place, they are necessary corollaries of internal government controls. Some countries will probably maintain far-reaching internal controls in post-war years, partly for the purpose of supporting the prices and incomes of their farmers. Secondly, various countries may need foreign trade controls as a means of economizing their foreign exchange—particularly their dollar exchange. They may have to ration their foreign exchange, in order to distribute it advantageously among different kinds of commodities. They may have great needs for industrial equipment, some kinds of which the United States will be in the best position to supply. Necessarily, the use of dollar exchange by foreign countries to buy industrial products will reduce their purchasing power for agricultural products. Such rationing of foreign exchange implies strict government control of imports.

Still another condition must be taken into account in appraising our post-war foreign trade. This will be the probable participation by the United States in broad international economic collaboration. As evidence, we have only to note the leading part that the United States has taken in the promulgation of the Atlantic Charter, in the food conference at Hot Springs, in the monetary conference at Bretton Woods, and in the peace-terms conference at Dumbarton Oaks. Also important in this connection are the Connally resolution adopted in the Senate (S. Res. 1942, 78th Cong.), and the Fulbright resolution adopted in the House of Representatives (H. Con. Res. 25, 78th Cong.).

Such then are the principal general conditions that will govern our post-war foreign trade policy: (1) The existence of a price-support policy for agriculture, bolstered by controls of imports and Government action with regard to exports; (2) the existence of State trading policies in many countries; and (3) the existence of a world policy for economic and social collaboration. In certain ways these conditions are seemingly irreconcilable. How to reconcile them effectively in some degree and at the same time to keep an appropriate place for private enterprise in foreign agricultural trade is a truly formidable problem.

Ways to Solve Foreign Trade Problem

Yet there is a way to solve it. The first necessary step is to recognize the implications of our price-support policy with its unavoidable corollary of governmental intervention in foreign trade. Within that framework, we must find ways which on the one hand will make it possible for the Government to establish rules for carrying on foreign trade in agricultural products, and on the other hand will provide definitely for the actual handling of foreign trade operations through private channels. Such a system has been developed already in some foreign countries, notably in Canada through the organization and operations of the Canadian Wheat Board. Necessarily, it presupposes cooperation between public and private agencies.

The second step would be to work out practical and effective mechanisms for international economic collaboration, with the object among other things of lessening the frictions and clashes that tend to arise between national or domestic agricultural policies and foreign trade policies. Such mechanisms would have to deal with many aspects of international commerce and would consequently have to be of various kinds. In some directions, notably in monetary arrangements, the world has made progress already in setting up international machinery. The proposed world agricultural organization as recommended at Hot Springs would lay a broad foundation stone.

But international action of a much more specific character will be necessary with regard to the agricultural surpluses that may develop when the war is over. Various countries will undoubtedly attempt individually to protect their farmers from the repercussions of surplus situations. Such purely national actions, however, will not go to the roots of the problem. In fact, the temporary shelter they give to individual groups of producers may make the general problem more

acute. Cooperative action by many countries simultaneously will be required.

International Commodity Agreements

Positive energetic programs should be started for developing and operating international commodity agreements in which all countries interested in the commodities involved would have the right to participate. Such agreements should have two major objectives: (1) Orderly expansion of production in line with actual needs, including the needs of people who may not have adequate purchasing power; and (2) the promotion of greater stability in world agricultural prices. Progress toward the second objective would be helpful not merely to the world's agricultural producers, but also to consumers of agricultural products. It would contribute to the stability of the world economy. As everyone knows, drastic fluctuations in agricultural prices in the past have contributed greatly to world depressions, unemployment, and underconsumption. Experience has indicated that no country individually can wholly prevent such fluctuations or obviate the bad effects. Experience has also indicated, however, that the problem might be manageable through international cooperative procedures.

AGRICULTURE AND WORLD FINANCE

The need for carefully considered and formulated policies for converting our wartime economy to peacetime needs becomes still more apparent when we review the increase that has occurred during the war in our total productive capacity. Our industrial production in 1943 was 239 percent of the 1935–39 average. Compared with that in 1929, the industrial output was 117 percent higher. In 1939 the level of our industrial output, though materially higher than in the extreme depression years, was considerably lower than it would have been had the rate of growth that characterized the period 1899–1929 continued. But even if the predepression rate of growth had not been interrupted following 1929, the wartime output in 1943 would have exceeded the normal expectation for that year by about one-fifth.

Likewise, our agricultural production has expanded beyond ordinary demands. From 1939 to 1943 it increased 25 percent, as compared with only 5 percent in the first 4 years of World War I. It should be noted that about 22 percent of the agricultural production in 1943 went into lend-lease exports and military uses. Although additional quantities of some foods would have been consumed by civilians had available supplies permitted, it is evident we must find peacetime markets to take the place of a large part of the wartime outlets or face the necessity of curtailing farm production.

Necessary economic readjustments will undoubtedly require a determined effort to maintain full employment and high consumer incomes. Essentially, we must choose between two major types of readjustments, and the decision will significantly affect the demand for farm products. One choice would make for a self-sufficient economy; the other for an economy with extensive foreign trade.

Theoretically it would be possible to have full employment in a largely self-contained economy. Practically, it would be very difficult. Self-containment would mean drastic industrial and agricultural readjustment, with heavy elimination of personnel from the export industries, which, of course, include agriculture. If new industries were to be developed to utilize resources used previously by export industries, the development would have to be in things for the production of which we have no comparative advantage. This would involve relatively high costs of production, and would consequently force the Nation to accept a lower standard of living.

Foreign Lending and Lowering of Barriers

The other course, that of developing active foreign trade to supplement active domestic trade, could be facilitated partly through foreign investment accompanied by a world-wide lowering of trade barriers. Many countries will be looking to the United States for machines and materials with which to revive their damaged economies. We shall have abundant means to produce things which will be in keen demand in war-devastated countries; such things as machine tools, metals, chemicals, automobiles, and other motorized equipment, and certain agricultural products. By helping other countries to buy our products, we can help ourselves to maintain full employment. Moreover, unless we help, we may not have very much international trade. In that case the market for agricultural products will suffer, not only in farm export lines, such as cotton and wheat, but in domestic consumption, since this will be affected by lack of an export demand for factory goods.

If we choose to aid in rebuilding the economies of foreign countries, exports in the post-war period will have to be financed in part with a flow of long-term American capital. This will necessitate propitious international conditions. We must assume, however, that such conditions will develop; for the intention to see that they do is one of our principal war aims. The world need for capital will be large. Capital has been destroyed during the war on an unprecedented scale. Thousands upon thousands of buildings have been demolished; factories have been dismantled; railway rolling stock has been bombed or left in disrepair; much equipment has deteriorated or become useless.

Without the aid of foreign loans, the deficits in war-torn countries will have to be replaced slowly and painfully out of current production in a manner that will involve a further reduction in standards of living. Temporarily, the import requirements of many countries may considerably exceed their exports. Consequently, if they do not get loans from abroad, they will lack foreign exchange, and will not be able to obtain many of the things they need. In particular, they may curtail their imports of farm goods, so as to release as much of their buying power as possible for reconstruction jobs. Farmers here would feel the effect of that decision.

Indeed, American agriculture has a large interest in wise policies for helping foreign countries to get foreign exchange—particularly dollar exchange. In the absence of sufficient means for making inter-

national payments, world demand for foodstuffs and fibers, as well as for industrial products, will decline. As far as possible, importing countries will grow their own foods and fibers, even if they have to do so at relatively high costs. In that event the drift toward economic nationalism or relative self-containment will be resumed, perhaps with bad effects like those it had before.

How May Borrowers Repay?

But making loans to foreign countries raises the question, How are the borrowers to meet the interest charges and ultimately to repay the advances? Loans that stimulate exports ultimately generate imports. This country has had an excess of exports over imports for three-quarters of a century. Foreign credits may help us to continue the excess temporarily. Ultimately, however, imports must be allowed to increase if we wish the loans to be repaid.

It is necessary to prepare for this development. The best preparation is full employment and a high national income, which will sustain both exports and imports on a high level. Experience shows that in prosperous times we absorb increased imports without difficulty. The problem can only be met by developing a vigorous export trade, based if necessary on a foreign lending program. Any other course would mean price declines and unemployment at once, because it would pile up surpluses of goods.

Our changing position in international trade is producing a growing awareness that we should participate in a lowering of world-trade barriers. Many believe that the future peace of the world depends on such a change. Our own interest is not so surely promoted by high tariffs now as it was when we were a young industrial nation. As the world's largest industrial power, the United States has more need of enlarged foreign markets than of high general tariff protection. Ultimately, therefore, it must accept more imports, so that other countries may obtain dollars with which they may purchase our goods and pay their borrowings from us. If we cooperate with other countries in rational trade policies, with an awareness of the fact that permanent trade presupposes an exchange of goods and services, we shall have a much better chance to escape post-war depression. This means, of course, that as a creditor nation we must raise our consumption level when our debtors begin to repay us.

Essentials of Sound Lending Policy

On the whole the period between the two wars was a period of low world prices for agricultural products and other raw materials relative to the prices of manufactured goods. After the present war, if the world attains a high level of industrial production with the aid of a stable flow of international credit, the position of agricultural products and other raw materials in international markets may be more favorable. Such a change would increase the purchasing power of countries like those of South America and the British Dominions, which depend primarily upon the export of agricultural commodities

and raw materials. It would assist them to promote world trade and improve their power to pay interest and amortization charges on foreign loans. Meantime, the United States might want to do more importing, notably as a means of replenishing its supplies of some raw materials. Our war effort, it should be remembered, has drawn heavily on some of our basic raw materials. This country's greater willingness to receive imports can also help world trade generally.

Our experience in making foreign loans in the 1920's, however, was not favorable and better policies will be required in the future. After World War I our foreign lending was not generally for productive purposes. It did not sufficiently enable the borrowing countries to produce means of repaying the loans. Moreover, we were unwilling to admit the imports which would have made repayment possible. Also the loans were not advanced in an orderly manner, such as would have helped to stabilize international trade. Often they were granted simply on the basis of the demand and the willingness of investors to purchase the related securities. After the present war our foreign lending must be better coordinated and directed.

Substantial aid will reach some of the countries previously occupied by Germany through the activities of the military occupation authorities and of the United Nations Relief and Rehabilitation Administration (UNRRA). Primarily, this aid will include:

1. Consumer goods for immediate needs, such as food, shelter, medical supplies, seeds, raw materials, and machinery.

2. Health services; aid in repatriation; rehabilitation of public utilities (light, water, communications) insofar as they can be restored for immediate needs; and assistance in procuring equipment for schools and universities.

The United Nations' Proposals

This assistance, though important, will not rehabilitate the industrial and transportation system generally. In itself it will not enable the countries that receive it to resume their normal production and international trade. To accomplish the latter objective will require foreign credits on a considerable scale. Accordingly, proposals have been formulated by the United Nations for the establishment of an international monetary fund and an International Bank for Reconstruction and Development. These plans will require the approval of the legislatures of the participating governments. Nevertheless, the fact that agreement has been reached provisionally is significant. It may be useful to summarize the essentials:

Under the first proposal, a fund would be set up with a capital of 8.8 billion dollars, of which the United States would have a quota of 2¾ billions. The fund administration would seek agreements as to rates of foreign exchange, and would develop policies to stabilize foreign exchange. Loans out of the fund could be made to individual countries to offset temporary shortages in their holdings of foreign exchange. In these and other ways the fund would help to establish a higher level of international trade.

The second proposed institution, namely the Bank for Reconstruc-

tion and Development, would have an initial capital of 9.1 billion dollars, of which the United States would supply about 3 billions. The bank would make loans direct to member governments, or would guarantee loans made by private capital to member governments. Its first purpose would be to provide working capital for the reconstruction of industry and agriculture in devastated countries. Later, it would be in a position to finance expansion of productive capacity in the less-developed countries. All member countries would share the risks involved.

With such a world organization, the flow of capital for investment would be less disturbed by cyclical developments such as have often interrupted it in the past. Moreover, foreign investment for long-range developmental programs could be encouraged. In fact, the investment of long-term capital is probably the field in which an international organization could contribute most effectively to world expansion of production and trade. The proposed Bank for Reconstruction and Development, after taking steps to hasten the recovery of areas now occupied by the enemy, would be able to provide longer-range capital for many other parts of the world.

United States Prosperity as World Aid

The United States, however, can also promote international prosperity and trade by other means. Participation in measures to provide a continuous flow of foreign investment is only one of the lines along which it can help. As the country with the largest industrial capacity, it is the most important world consumer of many primary commodities. Hence variations in our business activity affect the demand for commodities throughout the world. The best contribution we can make to world trade is to keep our own economy active and at the same time stable. The effect upon other countries will be profound and beneficial.

When the war ends, our industrial production will represent more than 50 percent of the world's total, as compared with about 40 percent before the war. This increase adds to the importance from an international standpoint of keeping American business active and steady. It is not too much to say, in fact, that growth in international trade, and growth in world prosperity, depend largely on how successfully the United States maintains employment, and eliminates sharp swings in business activity. Full employment here will contribute to full employment elsewhere; conversely, unemployment here will cause unemployment abroad, and will partly counteract efforts to facilitate international trade through foreign loans and other financial operations.

WORLD ORGANIZATION OF AGRICULTURE

Two out of every three people on earth are farmers, and all people are consumers of food and other farm products. No better starting place for a kind of international organization that will promote the interests of the common man can be found, therefore, than the field

of food and agriculture. This was undoubtedly one of the reasons why the first full-scale conference of all the United Nations was called to discuss food and agriculture. It pointed to the primacy of food and farming for peace as for war.

The United Nations Food and Agriculture Conference met at Hot Springs, Va., at the call of the President of the United States, in May and June 1943. Agricultural and nutritional leaders from all the United Nations took part. They concluded that scientists now know more about how people should be fed for healthy and vigorous lives, and more about how the necessary food can be produced, than ever before. In a few countries, like the United States, a large proportion of farmers and housewives are putting this scientific knowledge to practical use. These countries are producing more and better food, and being fed more healthfully, than ever before. Yet even in our own rich country there are many people who, because of poverty or ignorance, suffer from malnutrition. In poorer countries, especially those with a denser population on the land, like India or China, most people are hungry most of the time, and diets are monotonous and inadequate.

Need for World Use of Agricultural Science

The conference came to the conclusion that if modern scientific knowledge were put to use in all countries in producing as much food of the right kinds as possible, and in making diets as nutritive as possible, the world could make rapid advances toward assuring enough to eat for everybody everywhere. The conference recognized that food is only one sector of a program for an expanding economy. Industrialization is needed in many countries—as well as in many parts of the United States—to provide jobs for those who need work, and to give city people the buying power to pay for more and better food. Higher levels of foreign trade are needed so that each country can sell freely the things it can make to best advantage, and buy freely the things it needs from other countries. Security and freedom from aggression are needed before nations can go ahead safely on any economic program for peace.

The Conference recognized that other conferences and other groups would have the responsibility of developing these other necessary parts of an international economy of peace and abundance. But for the agricultural part, it recommended that the United Nations jointly set up a permanent organization to deal with agriculture and food, and that it be the job of this organization to help the governments of all countries to improve their agriculture and their nutrition, in order to realize the scientific possibility of greater productivity, prosperity, and health throughout the world.

Purposes of Proposed International Body

This proposal for a permanent international agricultural body was quite different from the proposal for an international relief body, which subsequently led to the establishment of the United Nations Relief and Rehabilitation Administration. UNRRA is a temporary

organization set up solely to deal with the immediate post-war problems in the invaded countries. Its object is a charitable one—to help feed and rehabilitate those war sufferers whose countries cannot care for them themselves. The proposed agricultural organization, on the contrary, is to be a permanent one; it will work with all countries to provide not charity but information and scientific knowledge.

In accordance with the Conference's recommendations, the United Nations Interim Commission on Food and Agriculture was appointed, with one representative from each country. It spent a year working out plans for the permanent international organization, to be called the Food and Agriculture Organization of the United Nations (abbreviated as FAO). A proposed constitution for the organization, accompanied by a report broadly outlining its functions and methods of procedure, was sent to governments by the Interim Commission late in the summer of 1944. The constitution provides that when 20 governments have signified their acceptance, the new organization will come into existence and the Interim Commission will be automatically dissolved.

The FAO will have two main objectives—the achievement of higher nutritional levels among all the member nations, and the development of agricultural production and distribution adequate for the world's needs. It is an obvious fact that the production and the distribution of agricultural products have never been adequately geared with the needs of the world's 2 billion people for food. If they were, it would be impossible to have surpluses of practically any farm products, and the difficulty in almost every case would be to produce enough. Every known scientific method for improving production and distribution would have to be used to the utmost.

Gearing of Production to Consumption

The premise underlying the FAO is that the gearing of producing ability to consumer needs is possible only by extensive international collaboration. Few nations can produce enough for all their own needs. Those that might be able to feed themselves completely soon run into trouble when they try to do so. Both ways, the world has had sharp lessons during the past two decades. First, widespread efforts at national self-containment before the war helped to bring on disastrous dislocations in world agriculture. Later, production was geared to need on an international scale to meet the war requirements of the United Nations, with results little short of miraculous.

Those responsible for drawing up the plans for the FAO—and they include scientists, economists, and other experts from many countries—are under no illusion that agricultural production and distribution are going to be balanced with consumer needs overnight. They believe only that if nations once agree to work together for better nutrition for their people and better agricultural production and distribution, there are a thousand things, large and small, that can be done to further those ends. Many of the things that are familiar to American farmers—agricultural research stations, extension work, county agents, vocational education, certified seed, tested fertilizer,

reliable insecticides—are little known in many other countries. The FAO will help them to develop these means to better farming and better living. One worth-while achievement will make the next easier; wisdom, will, and energy in international effort will grow with exercise. It is not necessary to start with a vision of the millenium. It is necessary merely to start along a road that has immense possibilities for human betterment.

Suggested Constitution of FAO

The proposed constitution of the FAO calls for an organization in which all member nations, large and small, will have equal rights, each being entitled to one vote in the periodical conferences. In addition to these meetings of the assembly, other conferences, sometimes regional, sometimes world-wide, will be held with representatives of producers, consumers, scientific and technical organizations, and others vitally concerned with the problems of food and agriculture. The working staff of the FAO will not be large, but it will be carefully chosen for competence in the various technical fields of nutrition, food, agricultural production and distribution, forestry, and fisheries.

American farmers, too, will gain from the FAO. It will bring for their use the latest results of scientific discoveries in all countries. It will help make all countries more prosperous, and thus help do away with economic want and misery, which has been one of the causes of war. It will assemble reliable world-wide data on demand for and production of all major farm products. Through assembling such facts for consideration by all countries together, the FAO may help nations to work out a better world-wide balance between supply and demand, so as to assure enough food and other farm products, and yet not let production of some things get so far out of balance with consumption as to impoverish producers. The goals of high levels of food production and consumption for all people, and high levels of prosperity for agriculture, are of just as much interest to our farmers as to those of other countries. Farmers like to produce all that consumers need. The FAO will be an international agency to help them do so with safety.

Essentially, the FAO will be a world clearinghouse of information regarding nutrition, food, agriculture, forestry, and fisheries. It will facilitate getting together in international agreements; it will stimulate research and the application of scientific methods; it will further cooperation in raising the living standards of consumers and advancing the welfare of producers. It will represent a large and important segment in any general international effort to bring about an expanding and healthy world economy.

FOOD IN CONTINENTAL EUROPE

The food situation in most continental European countries showed no marked change in 1943–44 as compared with 1942–43. A slight deterioration occurred in Germany proper, where developments in 1943 crop production and the prospect of some loss in supplies from the east

and southeast somewhat curtailed the total food allowances made available to German civilians in the 1943–44 season. Meat rations had been cut and bread and fat rations moderately increased at the end of May 1943. After the grain harvest, which, as in much of Europe, was better than in 1942 but still below the pre-war average, bread rations were again increased and the composition of bread became more nearly normal, with barley admixture reduced and potato admixture eliminated. The increase in bread rations in the fall, however, was made in anticipation of a very poor potato harvest because of prolonged drought, which was felt all over Central Europe, in the Low Countries, and in France. Potato rations had to be sharply decreased and partly replaced by bread.

In spite of the continued, if slight, deterioration in the German food situation, which has been apparent for some time, the people were still much better fed than in the last years of the First World War. Nevertheless, civilian consumption has been considerably restricted, compared with pre-war levels.

With somewhat smaller over-all production in 1944–45 and a loss of food from previously occupied areas in eastern and southeastern Europe as well as France, there is a substantial decline in total food supplies available to the country in the current season.

It should also be noted that domestic output differs a great deal in the various parts of the country—a fact that will have an important bearing on the food position in the different zones of occupation now envisioned. Germany east of the Elbe River is a surplus producer of foodstuffs, south Germany has a deficit, and production in western and northwestern Germany is greatly below even local requirements. If these regions were to be cut off from the surplus districts of the country and did not receive any other import supplies, a serious food crisis would be inevitable.

In both liberated and German-controlled Italy, the food situation in urban areas continued unsatisfactory. A smaller production of food in 1943 and the generally disrupted conditions connected with Italy's becoming a theater of military operations adversely affected farm deliveries and the flow of domestically produced supplies through controlled channels of distribution. The urban population in southern Italy, which even in normal times is a deficit area in regard to most essential foods other than olive oil, had to rely heavily on allied shipments of bread grains, sugar, and dairy products. In northern Italy, where olive oil is the only essential food which must be imported in any quantity in normal times, it became necessary for the Germans to supplement urban bread-grain supplies by shipments of rye.

Occupied, Liberated, and Neutral Countries

Food supplies in France were at least as large in 1943–44 as in 1942–43, but, as in Italy, the continued inability to control distribution effectively kept a large proportion of the urban population in distress. Although wheat production recovered strongly, only a small increase in bread rations could be made. Fat rations were cut in half, and even nominal attempts to maintain the Nation-wide meat ration were abandoned.

Conditions in Belgium improved slightly, but the reverse appears to have been true in the Netherlands. However, total per capita food allowances for the urban population remained larger in the Netherlands than in Belgium. In Norway there was no further deterioration, and in Finland at least some improvement was indicated. As in earlier war years, Poland was one of the worst problem areas on the Continent. Maldistribution continued to aggravate the food shortage in many parts of Spain. Portugal finally joined the rest of Europe in establishing food rations.

In Greece there was a further improvement in the very unsatisfactory food situation, largely as the result of increased food shipments through the International Red Cross, but supplies for the urban population were still at very low levels. Grave shortages likewise continued to prevail in parts of Yugoslavia. In Bulgaria, Rumania, and Hungary food production showed a definite increase in 1943 as compared with 1942, permitting an increase in bread rations in urban centers where the only attempt at rationing had been made.

The food situation in Switzerland, Sweden, and Denmark remained fairly satisfactory. Production showed a further increase in Switzerland and Sweden, and both countries continued to import some food from overseas. Production also showed an increase in Denmark, but the additional output was mostly exported.

Food Consumption in Europe as a Whole

Taking continental Europe as a whole, average per capita consumption in terms of calories in 1943–44, as in the preceding season, may be estimated at between 85 and 90 percent of the pre-war level. However, most of the farm population and preferred worker groups probably continued to eat about as well as before the war; and in those countries where distribution is not well regulated, a considerable proportion of the urban population has also been able to maintain relatively high standards of consumption by securing supplies in the black market or through their connections and family ties with rural producers. Thus the brunt of the food shortages has fallen on those urban consumers, mainly in the low-income group, who can obtain little beyond the quantities distributed officially. There were millions of people in Greece, Poland, Belgium, Norway, France, Italy, Spain, and Yugoslavia, whose average caloric intake was less than 75 percent of the pre-war level.

The reduction in food consumption in continental Europe since the outbreak of the war has been due in part to a great decrease in imports of foodstuffs and feedstuffs, and in part to a decline in agricultural output. By dint of a shift from feed- to food-crop production and a diversion of crop utilization from feed to food uses, it has been possible to maintain production of food calories for direct human consumption near pre-war levels. Adjustments along these lines can hardly be carried much further. The possibility of increasing food supplies, therefore, depends on an increase in agricultural output or an increase in imports.

During the current season, 1944–45, domestic production of food in continental Europe may be expected to show some decline as com-

pared with that in 1943–44, and the caloric value of total per capita food supplies available on an average for the Continent may be estimated at little more than 85 percent of the pre-war level, with composition of the food greatly inferior to pre-war standards. There is little doubt that the outlook for domestic production in 1945 is for a continued decline. The cumulative effect over the war years of the shortages in agriculture of manpower, fertilizer and manure, draft power and machinery, will keep crop production down. Moreover, the impact of military operations upon farming and transportation in general may have measurable repercussions on 1945 production and its distribution and the effective utilization for food.

Some of the factors mentioned already pose great problems in reoccupied territories. There is little doubt that upon the end of hostilities in Europe the Continent will be badly in need of food. Even if there should be no further decline in over-all production, a deterioration of the food situation in some areas and among some population groups must be feared because of transport difficulties and a prospective relaxation of the controls of food collection and distribution in a number of regions.

THE SOVIET UNION'S FOOD PROBLEM

The Soviet Union completed the reconquest of the large area overrun by the Nazis in 1941 and 1942. Roughly, 40 percent of some of the most productive cropland in Russia, devoted to grain, oilseeds, sugar beets, potatoes, and flax fiber, was in the zone of invasion and fighting. During World War I this rich agricultural territory, which normally produced surpluses of foodstuffs, for domestic consumption and export, was practically untouched by military operations.

The Nazi retreat from this area left in its wake terrible conditions and devastation—burned villages, destroyed tractors and other farm equipment, weedy fields, and wantonly slaughtered livestock. Slaughter or mass deportation of able-bodied farmers added to the handicap under which our ally is struggling. Every effort is being made by the Russians to rehabilitate the devastated regions.

The United States lend-lease food program for the Union of Soviet Socialist Republics has been in existence for nearly 3 years. Almost 3 million short tons or 6 billion pounds of food have been delivered by the United States to the Union of Soviet Socialist Republics, 60 percent of it within the third protocol year, July 1943 to June 1944. Third protocol deliveries were almost double those under the second protocol and many times those of the first. Wheat flour was the commodity delivered in largest quantity during the operation of all three protocols. Next in order of size were: Sugar, canned meat, animal fats and cured meat, and vegetable oils. All these products helped materially in feeding the Red Army.

FOOD CONDITIONS IN THE FAR EAST

In far eastern areas under United Nations' control the food situation this year has generally improved. Improvement has also occurred in certain parts of the areas controlled by Japan. On the other hand,

available information indicates that the situation in Japan proper has worsened.

In Free China the harvest of winter crops was the best in any year since the outbreak of war, and above the pre-war average. Conditions in midsummer gave reason to expect that the total production of all crops, winter and summer, would exceed pre-war levels and food conditions appeared to be satisfactory except in a few areas where drought, coupled with a lack of transport facilities, existed. In occupied China, favorable weather conditions made possible the harvesting of an unusually good wheat crop. This will greatly improve the food situation, which previously was serious in almost all parts of occupied China owing to drought, Japanese requisitioning, stoppage of imports, and economic disruption generally. Shortages in greater or less degree may be expected to continue, however, particularly in the larger cities.

In India the rice crop of 1944 was estimated at some 15 percent above the average crop of the 5 previous years. Production of wheat was estimated at somewhat below the recent average, but imports from Australia relieved this shortage. Serious food shortages continued through the first part of 1944 in Bengal and in certain other provinces of India that are normally deficit areas. Among the causes were elimination of rice imports from Burma, unusual internal demands, and overburdening of transport facilities. In the later months the large harvest of rice, along with increased imports of wheat from Australia, made the food supply adequate in practically all parts of India.

Food Conditions Worse in Japan

As mentioned, the food situation in Japan definitely worsened through 1944. Shipping losses reduced Japan's imports, and serious drought, together with shortages of fertilizers and of labor, reduced the domestic production. Possibly worse conditions prevailed in Korea; in Formosa, too, the rice production was reported to be lower than in recent years. These unfavorable developments undoubtedly increased Japan's difficulties, but did not bring about critical food shortages. Land not planted to rice produced sweetpotatoes and other food crops. Some wheat from north China probably found its way to Japan. In Manchuria, the southern part of which suffered from drought last year, the crops in 1944 were unusually good. Large quantities of soybeans and smaller quantities of rice, millet, corn, and kaoliang from Manchuria became available to Japan. If supplies from Formosa, Korea, and Manchuria continue to be available, Japan will probably be able to meet its major food requirements during 1945 on a restricted basis.

In areas which Japan has occupied in the South Pacific, efforts to achieve self-sufficiency in foodstuffs are under way. In the Philippine Islands some land has been converted from sugarcane to rice, and the acreage of other food crops has been increased. Nevertheless, food shortages exist in the large cities. It is doubtful, moreover, whether a complete food adjustment has been effected in certain food-deficit areas which formerly imported food from neighboring islands or

from abroad. Formerly imported protective foods, such as meats and milk, are scarce generally, and the supply of fish, normally obtained by offcoast fishing, has been considerably reduced.

The Japanese have likewise endeavored to promote food self-sufficiency in Malaya and in the Netherlands Indies. They may have had some success in Malaya, though a food shortage continues there. Serious food shortages probably exist on certain islands of the East Indies group as a result of a disruption of inter-island shipping. Reports indicate that Indo-China and Thailand continue to produce rice in excess of domestic needs. On the other hand, owing to loss of work animals and other causes, Burma's production appears to be less than its domestic needs.

After Japan Collapses

Some stocks of foodstuffs will probably be found in Japan after it collapses, but Japan's old problem of finding other than domestic sources of supply for about 20 percent of the food it requires will still exist. Indeed, the deficit may exceed 20 percent if yields in Japan proper decline from lack of fertilizers. Liberation of occupied China may disclose serious food shortages there, especially in the large centers of population. The agriculture of the region has been disrupted through many years of war; it will need time to recover. In free China, however, the food-supply situation should be relatively good, except in high-protein and protective foods.

The defeat of Japan, and the consequent liberation of Indo-China Thailand, and Burma, will release territories that before the war supplied 85 percent of the world's exportable surplus of rice. They should be able after the war to meet a large part of the cereal needs of deficit areas in the Pacific region, though these areas will also want wheat and wheat products in some quantity. Incidentally, they will also be in urgent need of cotton and cotton goods.

COOPERATION WITH CANADA

Cooperation with Canada to mobilize agricultural resources for the United Nations war effort has continued during 1944 and has been expanded. This working relationship is of vital importance now, and should be of great mutual benefit in the transition from war to peace.

Through many channels, such as the Joint Standing Agricultural Committee, the commodity committees of the Combined Food Board (in which Canada now has full membership), and the United States Agricultural Attaché at Ottawa, facilities in both countries have been brought to bear in joint analyses of food requirements, agricultural resources, and annual goals. Wartime distribution problems have been discussed from day to day. As a result, production in the United States and in Canada has been adjusted reciprocally through an allocation of tasks which has helped to increase production on both sides of the border.

The arrangement consummated under the Joint Economic Committees of the United States and Canada and announced in Washington and Ottawa in 1942 for the purpose of encouraging increased

production of oil-bearing crops in the United States, and of oats, barley, and flax in Canada, produced valuable results in 1943 and again this year. During the 1943–44 fiscal year, for example, Canada supplied about 135,000,000 bushels of wheat to the United States, mostly for feed purposes. In addition, it supplied us with more than 75,000,000 bushels of oats, nearly 40,000,000 bushels of barley, more than 8,000,000 bushels of rye, and 11,000,000 bushels of flaxseed.

Our imports of Canadian feedstuffs were a vital addition to our feed supplies. They helped United States farmers to maintain their livestock production and at the same time to divert acreage to the production of oilseeds.

Arrangements for seasonal movements of farm labor and machinery across the boundary, such as have been made anually since 1942, proved particularly helpful this year, since both countries had very large crops.

Agricultural Trade Across Border

Understandings between the United States and Canada have been reached also with regard to trade in agricultural products across the border. War conditions tend of course, to interfere with such trade. The understandings mentioned help to surmount obstacles. Apples, potatoes, and feed grains, for example, have been shipped from Canada to the United States, and potatoes from the United States to Canada, in agreed quantities. In the absence of special arrangements, the exchange would have been much more difficult.

Some agricultural problems which jointly concern the United States and Canada, and which existed before the war broke out, may assume large importance in the post-war period. Prominent among them is the problem of market surpluses of some products, with its bearing on tariff and other matters. Other matters of common interest such as the inspection of perishables and of products susceptible to pests or disease, problems of freight rates, differences in standards and nomenclature, and safeguards against occasional deficits, are of permanent importance. More or less informal methods of handling them, such as were in effect before the war, may have to be supplemented. Government officials, technical specialists, and commercial men in both countries, though they keep in touch with one another and work together in an effort to solve such problems, do not expect by such means to achieve more than partial success. It is coming to be regarded as highly important that improved channels of cooperation be established for handling trade in agricultural commodities between the United States and Canada.

INTERCHANGE OF SERVICES WITH MEXICO

Agricultural cooperation with Mexico was further strengthened in 1944 by the establishment of a Joint Agriculutral Commission. This Commission, established through an exchange of notes between the two governments, held its first meeting in Mexico City in July. The primary purposes of the Commission are to review and consolidate the many cooperative activities already under way, to explore ave-

nues for further cooperation which would be mutually advantageous, and to advise the two governments on matters of national agricultural policy. The importance attached to this Commission by both governments is demonstrated by the appointment to it of men in positions of high administrative responsibility.

At the meeting in Mexico City the Commission thoroughly examined all cooperative agricultural activities already being carried on, and considered those phases of the work which should be strengthened by greater cooperative effort. It gave attention also to additional fields of mutual concern in which new joint efforts would be of mutual advantage. Among the important problems regarding which definite agreement was reached and a program of joint effort formulated are: The exchange of scientific and technical information; protection and development of natural resources; economic studies of special commodities that are important in the United States trade with Mexico; certification of the validity, quality, and sanitation of seeds and livestock; measures to develop the rural economy; interchange of agricultural technicians and graduate students; and joint action to combat serious outbreaks of plagues of plants and livestock.

Existing cooperative programs have resulted in noteworthy accomplishments. Cooperative work in the control of insects has been broadened. Work on the control of the pink bollworm of cotton continues under a project with headquarters at Monterrey. This program includes measures that will reduce the pink bollworm in both countries—Mexico and the United States. Cooperative efforts for the control of the citrus blackfly, a serious pest, show considerable promise. It includes use of a parasitic wasp which the Department of Agriculture discovered in India and previously introduced into Cuba and Panama. Colonized in many parts of Mexico that are infested with the citrus blackfly, the wasp appears to be increasing satisfactorily.

Cordial relationships between quarantine officials of the two Governments are producing mutual advantages. For example, a survey in Mexico helped to determine the distribution of a potato weevil. As a result, the United States was able during the past year to open its markets to potatoes grown in parts of Mexico which had been thought infected with the potato weevil, but which the examination showed to be free from the pest.

Cooperation in Plant and Animal Husbandry

The inspection and quarantining of livestock furnish an outstanding example of cooperation between the two countries. Under a convention concluded between the United States and Mexico in 1930, close and extensive informal cooperation has been maintained for many years between the Mexican Veterinary Service and this Department's Bureau of Animal Industry. It has been particularly helpful in the control of the cattle tick and useful in preventing the spead of other livestock pests. Other cooperative activities deal with the suppression of cattle scabies, with measures to preserve the freedom of both countries from foot-and-mouth disease, and with the eradication of dourine of horses.

Exchange of planting stocks between the two countries continues. The important object is the production of complementary or noncompetitive crops. This Department obtains desirable seeds and cuttings from Mexico, while Mexico obtains useful plant introductions from the United States, such as shipments of cinchona seedlings. Cooperative rubber investigations, which include demonstration plantations of *Hevea brasiliensis*, are proving mutually beneficial. Cooperative investigations of other rubber-producing plants, such as cryptostegia and wild guayule, are in progress.

Broader cooperation has been started during the past year in sugarcane investigations. This Department has sent to Mexico a collection of sugarcane varieties and hybrids, which should assist sugarcane experimentation in Mexico. In turn, varieties and hybrids developed in Mexico will be sent to the United States.

Close cooperation between the United States and Mexico is proceeding in soil science and soil conservation. It includes comparisons of current methods and procedures in conservation, soil management, and irrigation. Experts of this Department are assisting Mexico in the planning of erosion and conservation surveys, and in revising Mexico's hydrologic reporting system. The Chief of the Mexican Department of Soil Conservation has visited this country to study the organization and operations of our Soil Conservation Service, and some of Mexico's soil technicians have spent months here for the same purpose.

LATIN AMERICA IN COOPERATIVE AGRICULTURAL PROGRAMS

In the Government's general program aimed at the development and maintenance of the closest possible friendly relations with the other republics of the Western Hemisphere, the Department of Agriculture is cooperating by: (1) Providing technical experts and facilities for the development of cooperative research on problems of mutual interest; (2) providing intern-training programs for agricultural specialists from the other American republics and assisting other agencies, United States Government as well as private, in planning related programs; (3) providing technical experts and superior planting stock for the purpose of expanding the production of natural rubber in the Western Hemisphere; and (4) encouraging the production of other strategic commodities, such as insecticides, cinchona and other drug plants, and essential oils, which must be imported into the United States.

The Office of Foreign Agricultural Relations, through its Technical Collaboration Branch, coordinates these various projects and activities and cooperates with other agencies engaged in similar work. In that connection it participates with the governments of the countries concerned in the joint operation of cooperative agricultural experiment stations in Ecuador, El Salvador, Guatemala, Nicaragua, and Peru, and collaborative research projects in existing institutions in Brazil, Colombia, and Cuba. In addition it integrates and coordinates: (1) The various intern-training programs of the Department for

Latin American trainees; (2) the natural rubber program of the Bureau of Plant Industry, Soils, and Agricultural Engineering; and (3) the various projects financed by Department of State allotments.

Long-Term Agreements

The cooperative experiment stations and projects operate under long-term agreements between the governments of the United States and of the republics concerned. Under those agreements the other cooperating governments are supplying land, buildings, associate scientists, clerical assistance, laborers, etc., and the major part of the personnel and funds necessary for their operation. The United States supplies a limited number of technicians, technical and scientific equipment not available in the cooperating country, and technical and scientific books and periodicals published in the United States.

On July 15, 1944, an agreement was signed with the Government of Guatemala for the establishment of a cooperative agricultural experiment station, primarily for research on cinchona (quinine). At the Tingo Maria station in Peru numerous projects are under way, including research in cinchona diseases, experimentation in methods of propagating and planting derris and lonchocarpus (important sources of rotenone), comparative studies and selection of high-yielding plants, establishment of cinchona and rubber nurseries, and demonstration plantings of rubber.

At the Pichilingue experiment station in Ecuador, several hundred thousand rubber seedlings will soon be ready for distribution to growers. Large plantings of derris for the production of insecticides already have been made in cooperation with the Ecuadoran Development Corporation. Soil surveys are being conducted to determine the best areas for nursery and commercial planting of various tropical complementary crops. Nurseries have been established in the highlands for production of high-yielding pyrethrum plants for subsequent distribution to producers of that important insecticide. Research work on cacao also has been initiated at Pichilingue.

Three agricultural technicians have been loaned to the Government of Colombia to assist that country in coordinating its agricultural research program and completing plans for the increased production of complementary tropical crops. New projects have been initiated at the El Salvador station to determine the possibilities of the yam bean as a source of rotenone and to investigate diseases attacking henequen. In Cuba several cooperative agricultural engineering projects are in operation. These are concerned mainly with the problems of planting, cultivating, harvesting, and processing kenaf (roselle), an important jute substitute.

At the recently established El Recreo cooperative experiment station in eastern Nicaragua some buildings have already been completed by the Nicaraguan Government and others will be completed within the coming year. Early in 1945 that station will have several hundred thousand high-yielding rubber plants for distribution to growers. Work previously inaugurated on rotenone-producing plants,

medicinals, essential oils, vanilla, and other tropical crops is being continued.

Cooperative Research Expanded

During the past year the Office of Foreign Agricultural Relations completed a survey of various derris plantings in Latin America and established a basic nursery of high-yielding plants at the Summit Gardens in the Canal Zone. In addition it completed an extensive survey of the lonchocarpus-producing area in Peru, as a result of which, selections and nursery plantings of that important rotenone-producing plant were made. The Office now is establishing projects in the cooperative stations for the study and control of leaf-cutting ants and other insect pests harmful to complementary crops.

Under its rubber program, the Department provides technical leadership and training through assignment of United States technicians to plan and guide the establishment of nurseries, develop proper planting and propagating practices, select high-yielding and disease-resistant plant material, and distribute basic planting stock. Blight-resistant stock is now being propagated for distribution in 1945 and 1946 for top grafting on high-yielding stock. Cooperative rubber nurseries and projects now are in operation in Mexico, Guatemala, Honduras, Haiti, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Peru, and Brazil. The extent of the cooperation by the various governments and local growers in the rubber program has exceeded expectations.

Thirty-one fellowships were awarded to Latin-American trainees under the intern-training program of the Department in the fiscal year ended June 30, 1944—8 in extension, 11 in soil conservation, and 12 in agricultural economics. In 1944–45, 6 fellowships will be awarded in the various fields covered by the Agricultural Research Administration. This training program is an important factor in increasing the competence of agricultural technicians in the other American republics.

At the request and expense of the Chilean Government, a commission of United States technicians recently completed a study of the forest resources of that country and made recommendations for the development, improved management, and better utilization of the forest resources of Chile for domestic consumption. Through the Agricultural Experiment Station of the Department, at Mayaguez, P. R., several million derris cuttings have been distributed to growers and experiment stations in Latin America.

Department entomologists assigned to the field station in Uruguay are seeking natural parasitic enemies of the white-fringed beetle, the sugarcane borer, the cotton boll weevil, the pink bollworm, and the vegetable weevil for use in the United States. In Mexico the regular quarantine work continues. Cooperative work with the Mexican Government is strengthening and coordinating the suppression of the pink bollworm of cotton. A cooperative project has been completed for releasing parasites for the biological control of the citrus blackfly on the west coast of Mexico.

Interchange of Education Facilities

Staff members of the Department have prepared handbooks on soil conservation and dairying in Latin America and pamphlets on miscellaneous agricultural subjects for translation by the Department of State into Spanish and Portuguese. Information on soil and water conservation programs and other agricultural programs in the United States has been furnished to the governments and technicians of other American republics through exchange of publications, correspondence, motion picture films, and photographs; and several countries, particularly Mexico and Brazil, have reciprocated.

OUR PRICE SUPPORTS

Even under war conditions ours is a price economy. It is natural and proper for everyone to be intensely interested in prices, in their trends and relationships, in price ceilings and price supports. These are all vital to the national war effort, as well as to the earnings and welfare of individuals. Anything that happens to prices also affects production, distribution, and consumption. It is the story of farm and city incomes, of rural and urban activity and employment, and of workmen's wages and employers' profits. Under war conditions, to be sure, the interest everyone has in prices should not be merely selfish, but should include also a sense of the national interest. But the idea one sometimes hears expressed, that in wartime people should forget about prices and simply get to work, does not make sense. The soybean grower, as well as the airplane manufacturer, must get a price which covers necessary costs.

The special wartime feature of the price situation is of course the extent to which the Government shapes it. As the largest single buyer of commodities, and also as the authority for seeing that production develops in the right directions, the Government largely supplants the normal interplay of purely economic forces. It has to see that prices are high enough to encourage useful production, and yet not out of line with sound fiscal and monetary policy. The success of the war food program depends in large part upon the wise use by the Government of its price controls. The machinery it uses consists of price ceilings and price supports which include commodity loans, contracts with processors and handlers, Government purchases of both raw and processed crops, arrangements whereby the Government purchases certain products at one price and sells them at another, and certain special payments and subsidies. This machinery is being used to bring about necessary adjustments in agriculture—both to help win the war and to provide a sound agriculture after the war.

The Position Before the War Began

Let us look first at the conditions that existed when the war began. It wasn't out of whole cloth, so to speak, that the country shaped its wartime pattern, but out of materials that lay ready—out of the pre-war structure of prices both at retail and on the farm, and out of

pre-war legislation and pre-war price machinery. Next, we will glance at what has happened since to prices and price relationships. We can turn then to the price-support programs for 1944; we can notice the different kinds of programs that we have in use, and inquire into the reasons for the differences. Finally, we may consider some of the limitations of the price-support programs—some of the things they can't do.

In August 1939, at the outbreak of the war in Europe, food prices at retail in the United States were lower than at any time since the middle of 1934. They jumped about 4 or 5 percent at once when the war broke out, but did not continue to rise. Thereafter, for about a year and a half, retail prices leveled off; they did not again advance significantly until the spring of 1941. In March 1941, however, a period of almost uninterrupted increases began; this period lasted until May 1943, or a little more than 2 years. The average cost of food at retail increased in this 2-year period by about 45 percent and reached a level which had been exceeded only in the inflation that followed World War I. Price-stabilization measures dominated the next phase in the retail price movement, especially after the President (in April 1943) issued his "Hold the Line" executive order.

Since May 1943 retail food prices have decreased about 5 percent; they are now slightly below the average for 1943. Similar stabilization has been accomplished in most other elements of the cost of living; these have increased less than food prices since the beginning of the war. The report of the Bureau of Labor Statistics for July 1944, for example, showed the average cost of living only 1.6 percent higher than that of April 1943, the month of the "Hold the Line" order. Farmers, as well as food consumers, have an interest in holding this line, not only through the war period but in post-war years. If it can be held, we shall have a better chance of escaping deflation disasters such as occurred in the 1920's and early 1930's.

Farm Prices Very Low in 1939

It is imperative, in considering the food-price situation, to bear in mind that prices for farm products were very low when the war began in Europe. In August 1939 farm prices averaged only 73 percent of parity; they averaged only 77 percent of parity for the entire year 1939. In the first period of the war the farm-price average increased very little. The increase for 1940 was only about 5 percent, but a few products rose much more than the average. Corn went up about 25 percent in 1940; wool, 27 percent; butterfat, 18 percent. On the other hand, hog prices declined nearly 13 percent. It was not until 1941 that a sharp rise began in farm prices generally.

In 1941, however, farm prices averaged 24 percent higher than in 1940. The largest increase was in hog prices—69 percent. Other livestock prices went up 15 to 30 percent. Meantime, grain prices advanced only 10 to 15 percent, so that farmers had a strong incentive to feed their livestock heavily and to expand their herds and flocks. Crops which had more than average price increases were rice, dry beans, truck crops, cotton, and oilseed crops. By the end of

1941 the average of all farm prices had reached parity, and most of the price changes that had taken place were encouraging the kinds of production the country most needed. Moreover, the upward trend was continuing, partly under the stimulus of support-price programs extended to more commodities.

The Advances of 1942 and 1943

The rise of farm prices in 1942 was greater than in 1941 and averaged 28 percent. Outstanding increases came in the prices for potatoes, hogs, tobacco, and cotton. Most livestock products increased about in line with feed prices, so that the stimulating feeding ratios of 1941 were maintained. By the end of 1942 farm prices were 14 percent above parity. Advances since then have about kept pace with the parity index, and in the last year both the prices and the index have been pretty stable. Some important changes have taken place, however, within the general framework, as we shall see from the developments of 1943.

For example, the increase in potato prices in 1943 was 71 percent greater than for other farm products. Grain and feed prices increased twice as much in 1943 as did prices for livestock and livestock products, and this was the most important change of all. It restored feeding ratios to normal and checked the stimulation of livestock feeding. Milk and butterfat, indeed, would show below-normal feed ratios if producers were not receiving the dairy production payments which began in October 1943. This change in the relationship of livestock prices to feed prices was necessary to help balance feed consumption with feed production.

Margins Not Greatly Changed

Substantial increases in retail food prices from the low level that prevailed in 1939 were inevitable. Many people attribute them largely to increased margins taken by middlemen. This opinion is not well founded. Part of the increase in food costs at retail reflects increased margins between the farmer and the consumer, but not a large part. Marketing margins in this country are large because products must be transported over long distances, and because consumers receive expensive processing, packaging, and distributing services. On the whole, however, the margins are not very much greater than they were before the war. For the important food products, combined in the proportion of average annual purchases, the margin has increased about 12 percent since 1935–39. Various subsidy programs, however, absorb some portion of this increase. Hence the amount of the marketing margin that consumers must pay on standard foods, or on the other hand that must come out of the farmers' returns, is not much more than the average for 1935–39. This means that, on an average, almost all of the increase that has taken place in food prices at retail has been reflected in increased prices to the farmers. They are now receiving something over 50 percent of the retail value as compared with an average of about 40 percent in 1935–39.

The Price-Support System

Against this background of recent price developments and current price conditions let us look now at what we face. The most important fact to bear in mind is that, for the time being, most prices are controlled prices. Few prices are now free to rise or fall except within narrow ranges without restraint, as they would be under normal supply and demand conditions. Support prices are the rule rather than the exception and ceilings have been put on most products. Many farm products are selling at or close to their ceiling prices, and with continuation of the stabilization policy ceiling prices are not likely to be much if any higher than they are now. Consequently, farmers should not expect any great increase in the average level of farm prices.

Support prices are now in effect extensively. The support-price program for 1944 includes 7 livestock products, 20 field crops, 15 fruits and vegetables for processing, and 49 seed crops. It thus covers a total of 91 individual commodities. Some support prices are at the ceiling levels, a few are above, but most of them are somewhat lower. Most farm products, though not all, are selling above their support prices. If all farm products were to sell at the floor prices, we should have decreases in most cases. Naturally, the decreases would vary considerably among the different commodities, but the average decline, if all prices dropped to the support levels, would be from 10 to 20 percent. We may infer, from this fact, that we can look forward to a fairly stable general level of farm prices for the 1944 season.

Everyday practice under the price-support system requires widespread knowledge among farmers of the purposes, the methods, and the necessary conditions and limitations. The main wartime purpose is to get crops and livestock with which to win the war; another purpose, subsidiary now and yet essential to the main one, is to protect the incomes of producers. Congress has provided tools for supporting prices; it has set standards to which prices must conform; it has prescribed certain rules which must be followed. Farmers and others interested in the price supports want to know more about the price supports than simply the announced prices. Support prices can be fully realized in terms of war effectiveness and protection of farm incomes only under definite prescribed conditions, within the limitations and standards established by the underlying legislation.

Four Types of Program

The price-support programs are of four general forms. First, we have the loan programs. These apply on basic crops and certain other crops which are nonperishable and marketable in the condition in which they leave the farm. Farmers can obtain nonrecourse loans on their commodity when it is put into proper approved storage. Legislation provides specifically for loan programs on the basic crops—wheat, corn, cotton, rice, tobacco and peanuts (for nuts). Loan programs have been provided also for flaxseed, soybeans, potatoes in the late-potato States, cured sweetpotatoes, dry beans and peas,

barley, grain sorghums, rye, hay and pasture seeds, American- Egyptian cotton, and naval stores. For some of these crops the price-support programs include other features in addition to the loans.

Second, we have purchases of commodities direct from farmers. Under this plan the support price is a purchase price, payable to farmers for the commodity in the form in which they market it. The commodity must be nonperishable and acceptable by the Government in the form in which the farmers bring it to the market places. Examples are peanuts, soybeans, tobacco, wool, hemp, and naval stores. In most cases the purchases are made by dealers who act as agents for the War Food Administration on a fee basis.

Third, we have a purchase program for commodities which are perishable or need grading and processing and which the Government could not accept in the form in which they are usually marketed by farmers. In this type of program the Government buys the processed product, or the graded and packaged commodity, from processors and dealers and wherever possible stipulates that specified minimum prices must have been paid to the original producers. Programs of this kind are in effect to support the prices of vegetables for canning, fruits for canning and drying, eggs, hogs, dry beans and peas, cover-crop seeds, and vegetable seeds.

The fourth type of price support is provided by means of payments to producers. These are made in two ways: Directly to the producer, or through the processor who buys from the farmer. Programs of this type are in effect for milk and butterfat, sugar beets, sugar-cane, and most varieties of dry beans. This type of program is adapted to commodities which are marketed by producers in a condition not suitable for storage or Government use. But an additional reason for the payment type of program is the fact that the administration has undertaken certain stabilization operations, with the two-fold purpose of encouraging farm production and controlling the cost of food at retail. Though different in their details, the stabilization operations are alike in principle; they involve special payments by the Government and allow farm prices to be maintained at an adequate level to get wartime production without increasing the cost of living.

Necessary Conditions of the Price Supports

In general, the price-support system, though far from perfect, is operating well, as we know from the wartime record both in farm production and in the maintenance of farm incomes. In 1943 agricultural production was 29 percent larger than the 1935–39 average, gross farm income was 118 percent greater, and net farm income was up about 154 percent. Price-support programs, however, cannot do certain things, such as abolish distance, make prices uniform throughout the country, ignore quality differentials in products, or function in the absence of necessary facilities for grading, storing, processing, or shipping commodities.

The support prices apply to specific places and also to specific grades, since the Government has to buy on grades. Sometimes, when farmers do not receive prices in line with the announced support levels, the

cause is some bottleneck between production and marketing—some lack of grading, shipping, or processing facilities. Moreover, price-support schedules have to be changed from time to time, and often must have cut-off dates or fixed periods within which they apply and beyond which they don't apply. Such dates should be kept in mind, because the price-support system depends on timing, as well as on the location and quality of products.

Price Support in Post-War Years

Congress has provided that for some farm commodities price support shall continue for at least 2 years after the fighting stops. This assurance applies to the basic commodities under the Agricultural Adjustment Act of 1938 and to commodities covered under the so-called Steagall Amendment to the Act, enacted July 1, 1941. From this post-war standpoint, we have a three-way commodity grouping. First, we have the basic crops; namely, cotton, corn, wheat, tobacco, rice, and peanuts for nuts. These basic crops must be supported in the 2-year post-war period, generally through nonrecourse loans at not less than 90 percent of parity; in the case of cotton, 95 percent of parity on the 1944 crop. Next we have the so-called proclamation commodities—those formally proclaimed under the Steagall amendment as needed in increased amounts. Government buying is a prominent method of supporting these proclamation commodities; they must be supported at not less than 90 percent of parity. Third, we have other farm commodities, for some of which price supports have been announced. Prices of commodities other than basic and Steagall amendment commodities must be maintained in a fair parity relationship to the extent that funds for such operations are available.

What will happen when the war drops out as a price support? Shifting production to peace needs, with minimum price supports unchanged, will obviously present problems. How are we going to meet them? First, we should weigh the fact that for the duration we have lifted all limits on food production. Acreage allotments and marketing quotas have been lifted, except for tobacco. Second, many of the commodities we are pushing in the war program may be less important when the war is over. As long as the war continues, price support open to all producers and covering all the production of the supported commodities, basic and nonbasic alike, should not cause serious trouble. But after the war it may. Whether the Government will then be able to guarantee prices for unrestricted production is a question.

The Supply-and-Demand Relationship

Under present conditions, direct Government action is not the only price support the farmers have. It isn't even the strongest. The war itself is a stronger one because directly or indirectly the war provides most of the farmers' market and would give them good prices most of the time and on most commodities without the help of price-support machinery. Hence, we shouldn't overestimate the operations of the Government as a price-supporting power. If we do, we may look to the Government when the war is over for more than it can accomplish.

Naturally, the price-support job will be more difficult then. We may succeed in keeping up urban employment and consumer purchasing power so that farmers will have a market for full production at fair prices. But even if we are successful in this, we will not have permanent outlets for some of the foods now going to the military and lend-lease programs. If we keep prices at near parity levels after the war, it may be necessary to return to acreage allotments, marketing quotas, and other means of keeping agricultural supply in balance with demand. Should that be so, it will be useful to remember that prices depend ultimately on the supply-and-demand relationship. They cannot be stabilized indefinitely by mere decrees or by accumulating surpluses through Government loans and purchases. Sooner or later, what is produced must be marketed and used.

WHAT TO DO ABOUT PRICES AFTER THE WAR

Agricultural prices are now at an attractive level. They have averaged above parity for almost 3 years and lately have caused farmers less concern than in any year since 1918. Currently, they are about 80 percent above the pre-war (1935–39) average. Prices received by farmers have accounted in the past for about 75 percent of the variation in the farm income, and the wartime price advance is the main cause of the fact that farm income is now at an all-time high. Nevertheless, some questions have been raised lately, as a result of the decline in potato prices in the summer and fall of 1943 and because of difficulties this year with egg and hog prices. These questions indicate that farmers are still aware of the price problem. Attempts to forecast what may happen to prices when the war is over will undoubtedly attract much attention in the months ahead.

In casting up the chances for the post-war years we cannot ignore the level of farm production. In 1943 it was about 29 percent greater than before the war, and current estimates indicate an even larger production for 1944. It seems likely, from the current outlook, that we shall end the war with chicken and hog numbers somewhat reduced and with milk production about where it is now. Cattle numbers, which were at an all-time high on January 1, 1944, will probably not be reduced to normal within the year or two immediately ahead. Total crop acreage when the war ends will probably be not much changed from the current level, and variations in crop production for the rest of the war period will depend chiefly on the yields obtained.

Briefly, the end of the fighting in Europe may leave us with an over-all farm production, for sale or for use on farms, 25 to 30 percent above the average for the 5 years 1935–39. Although Government action will undoubtedly be a potent farm-price factor in the post-war years, it won't be possible for farmers to forget the supply-and-demand situation. Even if it continues to be favorable, it will affect different crops in different ways.

Some Differing Opinions

Of course, there is considerable difference of opinion about the probable trend of prices and the price policies which should be fol-

lowed after the war. It may be useful, since post-war policies have not yet been determined and will have to be worked out through widespread discussions, to notice some of the differing views. One group believes farm prices will continue to be determined effectively by governmental action, in line with the assurances contained in the act approved October 2, 1942. In fact this group doubts that the assurances will be dropped even at the end of the 2-year period. It recognizes, of course, that procedures must be worked out for fulfilling the guarantees, but feels that with what the country has learned already about price stabilization the task should not be difficult.

Another group, however, maintains that the price conditions created under the controls of World War II are about the same as those reached in the World War I period under free price relationships. It has therefore little faith in governmental price operations, which it considers weaker than supply-and-demand forces. Still another group thinks concerted action to influence prices can work, but questions the probable effect of our parity standards and of the related control devices, both in the domestic allocation of agricultural effort and resources and in the field of foreign trade. All students of the subject, the proponents equally with the opponents of governmental price action, agree that it requires new intensive studies.

Some important related questions arise in the sphere of nonfarm prices, with which farm prices interact. They boil down to an issue which must tremendously affect agriculture. Should American business have largely competitive or largely administered prices when the war is over? Here the difference of opinion is not necessarily between privately determined and governmentally determined prices, because in the business world administered prices can exist more or less independent of Government action. Essentially, it concerns whether business itself should or should not control or administer its prices.

Administered prices arise in the business world when the seller is sufficiently strong and has sufficient control over resources and the market to make it possible to adopt and carry out a conscious price and production policy. Administered prices, if extensive in the business and industrial field, and even if nongovernmentally determined, would compel farmers to ask the Government to administer farm prices. Many economists believe "administered prices" offer the only workable business alternative on the one hand to laissez-faire and on the other hand to Government control. It is wholly improbable, they think, that business can go back to old-fashioned laissez-faire prices. Hence the implication for agriculture is plain. Agriculture too must have administered prices, though in agriculture's case with Government aid, since farmers are too numerous and too unorganized to do the job themselves.

Existing Price-Support Legislation

Actually, of course, the machinery for post-war governmental price action in behalf of agriculture exists already, and we have noticed its essential features, which meantime serve the wartime needs. Legislation directs the Secretary of Agriculture or the War Food Ad-

ministrator to support prices for the basic agricultural commodities and also for commodities which farmers have been formally requested (under the Steagall Act) to produce in substantially increased quantities. Moreover, legislation indicates the level at which this price support shall be provided—at not less than 90 percent of parity for the 2 years from the January 1 following the date on which the President or the Congress shall have proclaimed hostilities to have ended. As mentioned, the minimum for cotton of the 1944 crop is 95 percent of parity. This adds up to a far more difficult assignment than anything previously undertaken. As yet, it does not cover fruits, beef cattle and veal calves, sheep and lambs, and wool. It is to be expected, however, that questions would be raised with regard to these commodities should their prices break. Sugar beets and sugarcane are already covered under a special Sugar Act, and with regard to wool the Government has undertaken a purchase program. Wool growers will probably want it continued into the post-war years.

Requirements of Post-War Price Supports

Naturally the answer to the inevitable question "Can farm prices be supported when the war is over?" must be a conditional answer. It involves some if's. Prices can be maintained at the levels indicated if the Congress provides adequate funds, if means can be worked out for the storage and disposal of surpluses, and if production can be maintained not too far out of line with the effective demand. As to the financing, future funds must, of course, depend upon the action of future Congresses. Meanwhile the current policy of Congress is to provide adequate funds, and it should be noted that in extending the life of the Commodity Credit Corporation to June 30, 1945, the Congress specifically instructed the Secretary of Agriculture or the War Food Administrator to support prices at the announced level. In the immediate post-war years, or in the period often called the conversion or transition period, shipments abroad of food and other agricultural commodities for relief and reconstruction needs may clear the markets. As to that, it is too early to say. Our experience since 1933 indicates, however, that means can be found in any event to support prices and carry stocks of commodities for a considerable time.

Yet the same experience has also taught us that we may need improved ways of handling and disposing of surplus commodities. It may be important to fit price-support activities more closely to the specific needs of different commodities, through appropriate variations of the basic methods. In most cases the existing methods are only devices for immediately holding prices to a given level, and in themselves do not provide for the disposal of the product. True, the supplemental payments plan, whereby certain products can be moved to consumers at prices below the support level, has a surplus-disposal feature. Even this, however, may not suffice for the handling of excess supplies, particularly of perishable or other goods that are difficult to store.

Agricultural prices, of course, cannot simply be "fixed." It is necessary also to have consumption of the agricultural output—constant

clearing of the markets. If market outlets are insufficient, the effort to control prices may necessitate efforts either to control new production or to develop new markets. Control of acreage and production can be achieved for individual commodities, if the situation warrants it. The problem is different, however, when over-all or general restriction of the output seems to be in order. Our adjustment program in the early 1930's applied to particular commodities, rather than to farm production as a whole. It sought to divert land from crops such as corn, cotton, and wheat into other crops, especially soil-conserving crops, rather than to withdraw land altogether from production. Hence it consisted of essentially short-time devices, which would not serve to correct general overproduction. In such a situation such devices would be only a desperate last resort. Permanent solution of the agricultural-surplus problem requires the development of wider markets.

Importance of the Domestic Market

As shown elsewhere in this report, the domestic market is by far the greatest consumer of our agricultural products. Average per capita consumption of food has been rising slowly in this country since 1909. In the war years it has been rising at a more rapid pace, and stands now about 6 or 8 percent above what it was before the war began. In 1944 civilian consumption in the domestic market will absorb probably 75 percent of all the agricultural commodities sold or used for food. Purchases for the armed services and for lend-lease and other foreign shipment account for the other 25 percent. If the current rate of civilian consumption continues into the post-war years, with farm production maintained at the present rate, we shall need additional markets for perhaps as much as 15 percent of our food plus substantial quantities of cotton and tobacco. Foreign relief will provide a partial outlet temporarily, but eventually the relief demand will stop. Farmers may then have greater supplies of some commodities than they can easily sell. Maintenance of satisfactory prices, along with maintenance of full agricultural production, will require additional markets, or socially acceptable means of surplus disposal.

In between the wars, when the farm-surplus problem was acute, we developed various surplus-disposal measures. They included developments of new industrial uses for farm products, school-lunch programs, the food-stamp plan, and subsidies to move supplies into foreign trade. Large numbers of our people were not well fed, clothed, or housed, and studies showed that raising their diets to an adequate level would require substantially more food than they had been getting. The surplus-disposal programs consequently had social as well as economic utility. In dealing with post-war surplus problems, it will be natural to draw on our pre-war experience. It will be appropriate also to consider what the war period has taught us. Notably, the war period has shown that under full employment the average consumer is willing to use about 15 percent more food than he used in the pre-war years 1935–39. The best assurance of satisfactory prices for agricultural products is full employment. Anything less

is at best a makeshift. On the other hand, if we achieve full employment, our farm-price problems will certainly be much less difficult.

Price Problems in Export Trade

Nevertheless, the domestic market does not provide the total answer to the farm-price problem, as farmers have realized for many years. Satisfactory post-war prices for cotton and some other commodities, and perhaps for wheat and lard, may depend to a considerable extent on the foreign market. Our pre-war program necessitated crop adjustments, storage operations, marketing quotas, and export subsidies for the handling of important export crops, and what we shall need for that purpose in the post-war years is a problem not yet solved. Fortunately, it is being actively discussed; in other words, the first steps toward solving the problem are being taken. The discussion doesn't question the farmer's right to parity, but it reveals differences of opinion as to how parity should be sought. Specifically the question is whether we should hold to the domestic price level, drop down the world price level, or work out some compromise arrangement which would give farmers the equivalent of parity and yet not tie their prices rigidly to the parity formula.

The Parity Standard

On the assumption that farmers will continue to demand parity or its equivalent, some economists offer objections to the prevailing parity system. Parity prices, they say, are defective as a means of reckoning agriculture's fair return because they disregard three important elements therein—namely, specific farm costs, net returns to farmers, and the volume factor. Another objection these economists offer is that the current method of calculating parity prices, which takes 1910 to 1914 as the base period for most commodities, is arbitrary. Some other base period, they suggest, might serve as well or better. As a matter of fact, these objections have weight. Possibly the goal should be parity income rather than parity prices; and a parity-income standard already exists. As yet, however, no accepted method has been worked out for translating the over-all parity income into a series of prices per commodity unit. Essentially, in short, the issue is whether or not some improved method for calculating parity prices can be developed. It seems impracticable to drop the parity-price idea altogether, since prices are a convenient and even a necessary administrative tool. Advocates of the parity-income standard agree to that.

Probably the parity standard will be continued into the transition years in about the form in which we have it. It is more than a statement of what the farmers want; it represents an ethical idea and also a strong political and social force. Moreover, in the opinion of many, it harmonizes pretty closely with the verdict of long-run trends as to what the relative rewards of agriculture and of nonfarm work should be. Likely to be more controversial than the parity standard itself is the question how the effort to attain the standard will affect the

movement of American farm products into foreign trade. This is a familiar dilemma; prices maintained above world levels interfere obviously with exports. One proposed remedy would develop some form of the two-price system, whereby goods would sell abroad for less than they do at home. Another proposal would involve the use of supplemental payments to producers, so that commodities could move at lower prices. Some economists recommend supporting farm returns generally through the use of supplemental payments, and dropping efforts to support prices at any given level. In one way or another we shall have to modify our price system in order to get world trade, and the search is on for ways and means. The parity principle, however, can undoubtedly be kept.

Core of Price Problem Domestic

It is important not to overestimate the importance of the foreign market. After all, it is within the United States itself that our post-war difficulties will center. They will develop in connection with the search of veterans and workers for peace jobs, with the conversion of industry from war production to peace production, and with many other aspects of the program for maintaining full employment. It won't be easy to maintain fair prices and full employment, but the need to do so will be overwhelming, and much the greater part of the task will lie in the domestic sphere. It will be simpler in the domestic sphere, however, if we can make progress also in foreign trade. Primarily, the farm goal should be the same as that of industry; namely, full employment, since full employment is the best assurance of satisfactory farm prices. Attention will need to be given, of course, to other requirements, chiefly to the provision of necessary price-support funds, the development of improved surplus-disposal measures, the keeping of farm production fairly well in line with the effective demand, and adjustment of prices to foreign as well as home trade. But the core of the matter is the employment problem.

HANDLING FOOD RESERVES

The war has almost made us forget about food surpluses. Agriculture's immediate job has been to step up its production and it has done the job well. It has conquered predictions of a food shortage and, with the cooperation of food processors, has supplied enough food to accomplish four important war objectives: (1) To feed our military forces; (2) to help feed our allies; (3) to build up necessary food reserves; and (4) to provide an increased per capita amount of food for domestic consumers.

Food reserves or stock piles are of course essential in wartime. Congress has recently provided legislation under which a sound post-war program for disposing of Government stocks can be developed. It will be some time, however, before the details take shape. Meanwhile, it may be appropriate to mention three important matters of general policy adopted by the War Food Administration.

First, WFA reviews the food reserves often and thoroughly, and

endeavors to avoid building up supplies which may not be needed. Except to fill price-support commitments, it buys and stores only what seems to be definitely required and promptly sells any unnecessary Government stocks. At present the WFA is selling back to the trade between 8 and 10 million dollars' worth of food a month. Consumers are glad to get this food, which the market can now absorb at fair prices.

Second, some of our food stocks will be needed for relief in foreign countries. If we give this food away, or if we sell it at a low price, we must guard against any possibility that it may be reimported and sold in competition with current production.

Third, in disposing of food surpluses in the domestic market we must follow a pricing policy which is in line with the congressional mandate to support agricultural prices during and after the war.

It is still necessary to plan our production and procurement program in such a way as to make sure we have the stocks required for war purposes. After the war, however, it will be important to liquidate these stocks in a businesslike fashion without upsetting markets. The three general policies above-mentioned if carried out fully, should accomplish this object, and at the same time give adequate protection to farmers, to the food trades, and to consumers.

Increase in Government Procurements

This year has seen a further increase in Government procurement of agricultural products—for the armed forces, for lend-lease shipments, and for other war purposes. In the calendar year 1943 such purchases took an estimated one-fifth of the Nation's total food production. In the calendar year 1944 the proportion has increased one-fourth. Moreover, the production itself is larger; hence, the physical volume of food purchased by the Government is larger than these fractions indicate.

Procurement and handling of foods and other farm products for war use or to assure their availability to other procurement agencies has been handled through WFA techniques essentially the same as the preceding year:

1. Allocating supplies among claimants, including domestic civilians.
2. Controlling movements of commodities in accordance with the allocations, frequently through the use of food orders that require certain percentages of production or sales to be set aside for Government purchase, or restrict commercial sales through quotas.
3. Cooperating with other agencies, especially the Army, in carrying out a coordinated Government procurement program, and in economizing transportation and storage facilities.
4. Cooperating with the food industries by means of a system of Industry Advisory Committees. About 113 such committees are now in operation.

The following table compares lend-lease shipments of the chief commodity groups in fiscal 1943 and fiscal 1944.

TABLE 1.—*Lend-lease shipments for fiscal years 1943 and 1944*

Commodity groups	Shipments		Percentage change, 1943 to 1944
	1943	1944	
	Million lbs.	*Million lbs.*	*Percent*
Meats (dressed weight)	953	2,277	+139
Manufactured dairy products (milk equivalent)	3,470	5,312	+ 53
Eggs (shell equivalent)	738	1,057	+ 43
Fats and oils, edible	774	1,171	+ 15
Beans and peas, dry edible	273	457	+ 67
Vegetables, canned	57	213	+276
Fruits and fruit juices, canned	244	360	+ 48
Fruits, dried	232	340	+ 46
Fish, canned	215	157	− 27
Grain and grain products (grain equivalent)	1,445	1,301	− 10

Serious Problems in Food Distribution

Serious problems of food distribution have arisen. Transportation has presented a chronic difficulty. Shortage of cold-storage facilities has sometimes required the exclusion of certain commodities from cold storage, along with restriction of the length of time during which other commodities may remain in storage. The shortage of container materials of all kinds has been a problem. Conservation and re-use of wooden containers has been encouraged through various means, such as educational programs and adjustments in container prices and freight rates.

But the year has seen a streamlining of control measures, along with relaxation of many. Substantially fewer food distribution orders have been issued, and a number have been revoked, with the net result that the number in operation at the end of the fiscal year was smaller than at the beginning. Among those still in operation, restrictions were relaxed or partially suspended in some instances.

It has been possible to relax the rationing controls on a number of foods, and to avoid adding new items to the list. At the end of the fiscal year 1944, the number of ration points charged for many of the processed foods and for several items in the meats-fats ration group had been reduced to zero. In December, 1944, however, developments on war fronts necessitated some tightening of the rationing system, and consumers had to give more points for some items. The index of per capita consumption of foods (base period: 1935–39=100) stood at 106 in the calendar year 1943. It will reach 107 in the calendar year 1944, according to present indications.

Changes in Civilian Consumption

In terms of the several food groups, per capita civilian consumption for the calendar year 1944 is expected to exceed the 1943 consumption for meats, fresh fruits and vegetables, rice, and coffee, tea and cocoa. Except in the case of fruits and tea and cocoa, this will mean a higher consumption level than pre-war (1935–39). Some further reduction, however, is likely in the civilian consumption of canned fruits and dairy products, though not in total consumption of milk and milk prod-

ucts. Consumption of canned vegetables, potatoes and sweetpotatoes, dry beans, and poultry may fall below that in 1943. These estimates do not allow for home canning of fruits and vegetables. Anticipated 1944 consumption of other major commodity groups is close to the level of 1943.

War requirements for manufactured dairy products have been very high. Meantime, civilian demand for fluid milk has increased with surprising rapidity. In the winter of 1943–44 it became evident that this increase had to be checked in order to maintain the supply of manufactured dairy products for the Army and lend-lease. Actual civilian rationing of fluid milk, however, was avoided through the imposition of controls on milk dealers' distribution of fluid milk and fluid-milk products.

Special programs have assured food supplies for certain groups, such as undernourished school children and industrial workers in war industries. With the aid of a special congressional appropriation, the school-lunch program has been continued. Moreover, the quality of the lunches served has been improved. More than half the children reached are now receiving a full hot lunch.

The program for providing in-plant food service for workers in war industries has borne good fruit. A year ago, around 4.5 million workers were using such facilities. During the fiscal year 1944, new or expanded facilities made on-the-job food service available to an additional 1.5 million workers. About 11,000 manufacturing plants now operate some type of in-plant food service.

TERMINATING WARTIME CONTROLS

Removing or continuing price control beyond the end of the war raises difficult questions. How long should price control continue? What commodities should it cover? And what should be the criteria for regulating peacetime prices. Answers to such questions must balance the danger of inflation against the desirability of restoring the peacetime price system. They must include estimates of how the prices of different commodities or different groups of commodities will probably behave. Adoption of criteria for peacetime price policy requires a study of normal price relationships, of production costs, and of ways to maintain desirable price flexibility in the transition period.

It may be desirable to begin the post-war period with a more or less general system of price control which can be modified as the inflation hazard declines and as the supply of different commodities comes closer to the demand. In the first post-war year many commodities may have to be under control. Before the end of the second year, however, most commodities may be out of the control system. Farmers have a special stake in post-war price control, since price rises in the absence of controls are more likely to affect the goods they buy than the goods they sell.

The situation is not quite the same for food products as for many nonfood items. Prices of foods now average well above their usual relations to other prices. Prices of nonfood items in the post-war

years would therefore have to rise greatly before food prices would rise too. Perhaps only a high degree of inflation or a serious dought or crop shortage could send food prices in general much above their present levels. But we may escape serious over-all inflation. In that event, food price controls will likely be among the first to be dropped.

The problem of food rationing in post-war years is simpler than the problem of price control. As soon as the domestic supply of food is large enough to meet the demand at existing prices, rationing can be dropped. The present system of coupons and points is flexible; it can be adapted to post-war needs or suspended, as needs dictate. Probably food rationing will not need to continue very long, except for one or two items, such as sugar and fats, which may have an extremely large foreign demand relative to the supply in the early post-war years.

Measuring Foreign Requirements

Study of food requirements in the United States, together with study of foreign requirements that may have to be met out of the United States supplies, is necessary to gage the possibility of a surplus problem in the post-war period. Probable United States requirements, both in terms of willingness of consumers to purchase foods and in terms of dietary needs, have been formulated. The size and nature of probable foreign requirements, however, are only beginning to emerge. Many of the factors are extremely difficult to measure, or rest on policy decisions not yet made. Among these factors are: (1) Actual food deficiencies in foreign countries, (2) the current output of agriculture in these countries, (3) the rapidity with which agriculture in war-torn countries can recover, (4) the ability of countries other than the United States to supply foreign requirements, (5) the extent to which requirements can be met out of stock piles, and (6) financial aspects of the problem, such as the prices at which food supplies will be sold, the amounts that foreign countries will be willing to spend for food, and the extent to which the United States will shift from a relief or lend-lease basis to a commercial basis. Immediate post-war demands for shipments of food abroad will be large, though probably not so large and not so sustained as many persons have expected.

OPERATIONS OF THE COMMODITY CREDIT CORPORATION

The effort in post-war years to provide price supports for farmers will require the cooperation of the Commodity Credit Corporation. Previous sections of this report have described the requirements in some detail and discussed means available to fill them. Briefly, price supports on basic crops and on the so-called Steagall commodities must be continued at not less than 90 percent of parity for at least 2 years after Congress or the President shall have pronounced the hostilities to have ended. On other commodities lending and purchase operations must be carried out, to the extent that funds permit, so as to

maintain the prices of these commodities in a fair parity relationship with basic and Steagall crops. These directives make a large order, the carrying out of which will require additional funds. Also needed are some important changes in surplus-disposal authorizations and procedures. Financial aspects of the program will draw upon Commodity Credit Corporation facilities.

It is to be expected, of course, that we shall end the war with a considerable accumulation of agricultural commodities on hand, just as we shall end it very properly with a substantial surplus of munitions. In war strategy, food production and munitions production stand on the same footing; they represent means of fighting and, as such, must necessarily provide big reserves. When the fighting stops, however, above-normal food reserves should be gradually liquidated, partly through special means of boosting consumption both at home and abroad, and partly through the diversion of supplies to nonfood uses. Moreover, it may be necessary to find ways of controlling the flow of new supplies, since agriculture's wartime momentum will surely continue for a while. Necessarily, this program will affect CCC operations at many points.

As an integral part of the Federal agricultural agency, the Commodity Credit Corporation may have to apply more broadly a principle in use already, whereby in certain cases Government-owned products may be released at prices lower than those which the Government paid for them. Export crops provide an example. Under war conditions the movement of crops into foreign channels has taken place largely under lend-lease arrangements. After the war, however, some of our price supports, which are above probable world prices, will tend to inhibit foreign trade unless we sell exports at lower prices. Recent legislation grants necessary authority. If employment lags and a depression develops, the two-price principle may have an application also to supplies for domestic consumption, through some revival or variation of the pre-war stamp plan and similar means of stimulating consumption. Supplies which the Government may have to acquire in pursuance of price-support directives must not be wasted, but moved into consumption in whatever ways appear to be socially desirable. The procedure will take shape partly through the Commodity Credit Corporation.

Cost of CCC Operations

Obviously, in view of the extent to which the Congress has directed that price-support operations shall be carried on, we must expect the job to be expensive. In this respect, however, it is on a parity with other aspects of the reconversion problem, and the cost should be reckoned as a war cost. After having asked farmers to produce without limit, the Nation cannot leave them holding the bag. It may be taken for granted, therefore, that post-war price-support commitments will be carried out to the fullest practicable extent, with the help of loan, purchase, or other operations of the Commodity Credit Corporation. Farmers and others should understand, nevertheless, that the task is not exclusively financial. As in pre-war years, when the problem was simpler, it may require crop adjustments, controlled

marketing, means of selling crops abroad, and well-sustained domestic consumer buying power.

Wide Ramifications Throughout the Economy

In short, the problem will not center narrowly around prices. It will extend throughout the economy, into the industrial as well as the agricultural parts, and will especially involve the level of consumer buying power; if industrial production and consumer buying power are maintained at high levels, the agricultural support-price problem will be greatly simplified; but if consumer buying power falls, the expense and complexity of maintaining the price supports will rise. The wide ramifications of the matter show up clearest in connection with the export crops. As mentioned, the Federal agricultural agency will need authority to export surplus agricultural commodities at competitive world prices subject, of course, to any broad international controls in which this country is cooperating with other countries, exporting and importing countries alike. The Surplus Property Disposal Act of 1944 (Public Law 457, 78th Cong.) authorizes the CCC to sell, or to cause to be sold, farm commodities and the products thereof in world markets at world prices.

The cooperation of a large number of Government and private agencies will be required to make the price supports effective. It is Commodity Credit Corporation policy to leave the actual handling of commodities in the hands of the trade. This arrangement, however, doesn't cover everything that must be done in connection with the price supports. For example, it doesn't extend on the one hand to the farms, where crop adjustments must be planned and carried out, or on the other hand to the Government agencies both foreign and domestic that have to do with world trade. Even in secondary matters, such as the diversion of surplus food products to industrial uses, the CCC must cooperate with a number of governmental agencies, because the job is inseparable from the management of our entire national policy.

Comparison With Pre-War Commodity Credit Corporation Task

As a means of gaging what lies ahead for the CCC in the event of lagging consumer purchasing power, we may compare its current responsibilities with those it handled before the war. Now, it must implement price supports at not less than 90 percent of parity for between two-thirds and three-fourths of agriculture's production and must maintain prices as close to parity as possible for the rest of the farm output. In the 1930's it will be recalled, the CCC had to provide loan funds only for a few crops, with producers engaged simultaneously in making acreage adjustments. It is one thing, however, to promote crop adjustments for just a few crops, from which farmers may shift easily, and quite another to organize a general retreat in crop and livestock production, with price supports effective right across the board. Moreover, the support level is attractive to producers; they will want to keep on producing for it.

These facts show clearly that unless industrial production and consumer buying power are maintained at high levels post-war price support will be difficult. Under conditions which require extensive price-supporting activities, effective price support means keeping prices above what they would be otherwise, and consequently involves withholding a part of the supply from normal trade channels. Experience in many countries, during many centuries, has shown that price support cannot work for long with production unrestricted.

One of agriculture's goals, however, is freedom from severe crop restrictions. Another name for this goal is a constantly expanding market, in which price supports will not be needed. If agriculture's market does not expand in the post-war years, production continued at wartime levels might saddle the Government with an unmanageable surplus-disposal job. Hence the Commodity Credit Corporation reminds farmers that part of the post-war price-support task will be their responsibility, and will concern the volume of production and marketing.

It isn't necessary to anticipate this duty. We shall want large production in 1945, about on a par with that of the earlier war years. There is a tremendous world-rehabilitation job ahead, part of which may be advanced through commercial as well as noncommercial shipments. Moreover, the war is not over yet. Finally, it is hoped that programs will be developed that will be effective in maintaining industrial production and consumer buying power at such a level as will minimize the agricultural price and income problem. But it should be kept in mind that a situation may develop later in which the Government will be at very heavy expense to make the price supports effective. In that event it may have to ask farmer cooperation, just as it did in the 1930's, so that the supplies which must be taken off the market will not become too large.

AGRICULTURAL ADJUSTMENT AGENCY

It was on May 12, 1933, in a period when farm surpluses were enormous and farm prices were far below the pre-war (1910–14) level, that Congress passed the first Agricultural Adjustment Act, with provision for the creation of an Agricultural Adjustment Administration. The purpose was to establish such a balance between the production and the consumption of agricultural commodities as would restore the purchasing power of farm products to the level of the base period. Except for tobacco, the base period was August 1909 to July 1914; for tobacco the base period was August 1919 to July 1929.

Crop adjustments and marketing agreements were the principal means indicated in the legislation for raising the incomes of farmers. It was evident from the language of the act, however, that the Congress did not wish to cause crop shortages; it envisaged a program calculated to promote the general welfare as well as the welfare of agriculture. Briefly it contemplated balanced abundance, not scarcity economics. The next year, 1934, was a drought year. Accordingly the Department of Agriculture through the Agricultural Adjustment Administration cooperated with farmers to step up production in the lines in which

the drought had cut it down too much. The same general policy governed the Agricultural Adjustment Program in subsequent years. For example, it applied the principle of the Ever-Normal Granary, whereby surpluses produced in bumper-crop years became reserves against possible crop-failure years. At the same time prices were maintained at fair levels by means of commodity loans.

In 1938 Congress passed a new Agricultural Adjustment Act, with broad provisions for soil conservation, Ever-Normal Granary facilities, the development of new uses for agricultural products, crop insurance, and marketing controls. It had become clear that agricultural adjustment required not merely the reduction of surpluses but frequently the expansion of production in various lines, along with the maintenance of adequate reserves against shortage, and far broader conservation of the soil. In the years that immediately preceded the present war the program developed along these varied lines, with the result that when the war broke out we had substantial crop reserves, which became our first line of defense and of attack on the food front.

Naturally the war period altered the direction of the farm program. Crop adjustments for farm income, reduction of wasteful production, and soil conservation gave place to all-out production with emphasis on conservation to assist in the production. The production program gave special attention to oil-bearing crops, livestock, poultry and dairy products, and certain fruits and vegetables. Marketing quotas, except for tobacco, fell into abeyance; they remained effective for tobacco because it seemed desirable to emphasize the production of food crops.

War Diminishes Acreage-Allotment Needs

As the war needs increased, the need for acreage allotments diminished. The Agricultural Adjustment Agency, through its farmer committee system, emphasized larger and more efficient production of the crops most urgently required. It assisted farmers in drawing up plans of production for their farms, in handling farm transportation problems, in feed and seed distribution, in solving problems connected with farm machinery and supplies rationing, and simultaneously in maintaining soil conservation practices. As had been intended from the beginning, the AAA program proved as well adapted to upward crop adjustment as it had proved itself able in the depression years to lessen the burden of the surpluses.

As we approach the reconversion period, the tasks of the Agricultural Adjustment Agency will necessarily change again. They will depend on what happens in urban industry and trade on the arrangements the country succeeds in making with other nations for the restoration of world trade; on the duration of hostilities in the Pacific; and on the Government's policy as a whole in regard to price controls, price supports, and liquidation of wartime food reserves. It is consequently impossible to foresee details of AAA post-war programs. Along broad lines, however, some inferences can be drawn.

For example, the soil-conservation features of the AAA program must be continued; they have been extremely successful. These programs, which have embodied research and the practical experience of

farmers, and which have been applied pretty generally throughout the country through elected farmer committees, have greatly improved the efficiency and scope of soil-conservation practices. This year farmers have carried out a greater number of conservation practices than in any previous year, though they have had to contend with shortages of labor and of equipment. Besides conserving soil, the conservation practices have increased farm production. Farmers will unquestionably wish to continue them, as a means of correcting the results of the tremendous drain of all-out war production on soil fertility.

Requirements for Reconversion Period

Specially necessary in the reconversion period will be the reestablishment of crop rotation, the reseeding of much land to grasses and legumes, and the expansion of terracing and contour farming and other water-conservation and erosion-control practices in many areas. Current AAA programs encourage all these practices, partly through education and partly through conservation payments to cooperating farmers. The Nation's soil resources are its capital stock, of which the farmers are the chief custodians. It can be taken for granted, therefore, that a Federal program of assistance in soil conservation will be continued as part of the Agricultural Adjustment activity.

Other sections of this report describe changes that will be necessary in agriculture's production pattern. In this connection, too, the AAA will probably have post-war tasks. It is too early to suggest the form they may take, except in a very general way. Where great increases in cultivated land have occurred, as for example in the Corn Belt, it may be important to encourage extensive replanting of grasses and legumes. Conservation programs may likewise encourage increases in soil-conserving crops, especially if the decline in the post-war demand for food exceeds present expectations. As to whether any return to acreage allotments and marketing quotas will be necessary it is impossible as yet to say. But it is important to note that the legislation which authorizes such procedures is still in existence. They should be used only as a last resort.

UPWARD TREND IN FARM MECHANIZATION

The upward trend in farm mechanization has continued during the war and will undoubtedly continue in the post-war years. It was estimated on January 1, 1942, that the United States had 1,844,000 tractors, including garden tractors, on its farms. By January 1, 1945, the number will probably be about 12 percent higher. About the same percentage increase is likely to be reported then in tractor plows, tractor listers, and tractor-drawn disk harrows.

In certain types of machines, such as combines, corn pickers, milking machines, tractor cultivators, tractor mowers, and windrow pick-up balers, the increase will be even more pronounced. It may exceed 49 percent in milking machines and 67 percent in pick-up balers. On the whole, the wartime increase has been greatest in harvesting machinery. Farm machinery programs have especially recognized the need to

compensate for harvest-labor shortages, and have granted relatively liberal quotas for harvest machines.

Numbers of some farm machines, however, have declined. Grain binders are not now required to the extent that they were in pre-war years because of increased use of combines. Consequently, production of binders in the war years has been substantially below what it was in pre-war years. Grain drills have not met wartime replacement needs. Numbers of horse-drawn farm machines have declined, in line with the continued decline in farm work animals. Consequently the total demand for farm machinery has far outstripped the supply, despite the fact that production in many important lines has been well maintained.

Modern methods of handling crops have nevertheless replaced hand methods or slower machine methods to a surprising extent. About 25 million acres of corn were harvested in 1944 with the corn picker; probably more than 50 percent of all our small grains were harvested with the combine. Farm machinery is being used on more days annually, because farmers pool or hire it. Extra time spent on machine operations cuts into the time available for other farm jobs, and some tasks have remained undone. For example, farm improvements are in arrears, and in post-war years will doubtless claim more attention. In post-war years, however, the supply of farm machinery will rise; the increase will economize farm man-hours and allow time for catching up with postponed work.

In November 1944 the War Food Administration ended the rationing and distribution of all farm machinery and equipment.

Farm-machinery rationing was instituted in the late fall of 1942, when war production limitations had reduced the authorized production of farm implements for 1943 use to approximately 23 percent of the production in 1940. Throughout most of 1943 approximately 75 types of farm implements were rationed. In the fall of 1943, however, increased production of farm implements (to an authorized total of about 80 percent of that in 1940) made possible a reduction in the list of rationed implements to 31 types. In July 1944, following further authorized increases in machinery production (to a total of about 100 percent of that in 1940), all but 19 types of farm equipment were made ration-free.

Farm-machinery distribution under the rationing programs, by providing implements in areas where, owing to past farm production practices, necessary types and quantities of farm machinery were not available, facilitated substantial increases in the production of essential crops. An example was the supplying of soybean equipment for areas in which there had been little or no past production of this crop, and the supplementing of existing machinery in producing areas that were materially increasing their production. Rationing served to encourage increased production of essential crops by making possible the placement of implements on farms where maximum production increases would result. The rationing was done by county farm rationing committees composed of local farmers.

The monthly rate of production of farm machinery increased considerably during the year ended June 30, 1944. Although the entire

authorized program was not altogether produced, the actual production of new machines was somewhat greater than in 1940. The program now authorized for 1944–45 is about the same as production in 1940.

The supply of crawler tractors for farm use, however, will continue to be limited because of large military requirements. In general, the production in 1945 of machines for preparing land, planting and seeding, cultivating, and spraying and dusting crops is expected to be substantially larger than for any of the previous war years. The upward trend in farm mechanization will undoubtedly continue into the post-war years under the stimulus of a strong demand for the replacement of worn-out or obsolete machines.

Some Probable Post-War Needs

Purchases of tractors for several years after the war may average 200,000 units annually. It takes about 100,000 units annually for normal replacements. Moreover, about 150,000 of the tractors now on farms have run much longer than the usual active-service period, and the replacement demand will be above normal. An additional 50,000 units will be needed to offset the decline in farm work animals. As compared with that in pre-war years the demand for crawler tractors immediately following the war will be relatively greater than for wheel tractors, since delivery of crawlers for agricultural use has been heavily curtailed. Production of other farm machinery in post-war years may closely follow the main pattern of tractor production, though technological improvements will increase the demand for some machines at the expense of others. Motor trucks and farm automobiles will unquestionably be in greater demand than ever before. Wartime replacements of motor vehicles have been small, and the need for new ones has become urgent.

RURAL-URBAN COOPERATION TO PROVIDE EMPLOYMENT

Many farmers want to know the prospect for consumer demand in post-war years. They show special interest in agricultural-industrial relations. The Department's post-war planning has included efforts to acquaint farmers with the facts as to agriculture's interest in markets here and abroad and efforts to aid agriculturally based communities to develop their own plans for post-war employment.

One phase of this work summarizes the pertinent economic facts in simple graphic fashion and in forms useful in facilitating discussions of the rural-urban problem. Two pamphlets have been issued, one on the farmers' interest in domestic markets and the other on their interest in foreign markets. Other pamphlets on other major questions in the maintenance of peacetime employment are in preparation.

In addition, in cooperation with other agencies, the Department has provided direct aid to agriculturally based communities that wish to make their own plans for helping to maintain employment after the war. The cooperating public agencies include State land-grant

colleges, State industrial boards or commissions, the Federal Reserve banks, the Departments of Commerce and Labor, and the Smaller War Plants Corporation. Private organizations that have interested themselves in post-war problems, such as farm, business, and labor organizations, are also cooperating.

Communities that use this service usually set up their own post-war committees on which all major community interests are represented. Members include businessmen, farmers, workers, and local government officials. The committees survey the local prospects with regard to jobs needed, jobs likely to be available, and jobs that local employers plan to create. In the light of these facts, they develop their programs. Technicians from public agencies help the committees in making statistical and economic surveys, and in appraising possibilities for new post-war industries. It should be emphasized, however, that the public officials merely provide information. Local people, both urban and rural, will have the responsibility of carrying the programs into action. They reach their own conclusions and make their own plans.

Ground Work Laid in Pioneer Survey

This work is a more intensive development of general methods followed in a survey of Albert Lea, Minn. Undertaken by a committee of community leaders in cooperation with the Committee for Economic Development, the Minneapolis Federal Reserve Bank, and the University of Minnesota, the Albert Lea project was the first of its kind. It laid a ground work since followed in other communities, with the addition of more detailed analysis of local problems and industrial prospects.

Studies of this type have been completed in Fort Smith, Ark., and Anderson, S. C. Similar ones have been started in a number of other agriculturally based communities. Public agencies have provided technical help in every case. As rapidly as technical personnel can be spared from war duties, it will be made available to other communities that wish to develop post-war plans of their own.

Farmers can help themselves by helping urban community leaders in programs for post-war employment. In many communities, especially those of not more than 25,000 population, farm income and farm purchases make up the backbone of local business. Conversely, the local business situation has an important bearing on local farm incomes. Moreover, whatever helps local industrial development and expansion contributes to the health and vigor of industry throughout the country. Hence community cooperation between city people and farm people, which can take many different forms, protects the stake that farmers have in well-maintained community employment.

RURAL HEALTH, SANITATION, AND SAFETY

About three-fourths of the States participating in post-war planning activities are giving special attention to rural health and sanitation. They recognize the need for positive action to reverse recent unfavorable trends in rural health personnel and facilities.

The need for extensive measures to improve rural health appears in the high burden of illness and preventable death among rural people, in acute shortages of medical and related personnel, and in lack of health facilities. The high selective-service rejection rate among farm youth is significant. Rural physicians and dentists are sometimes in the older-age groups of their professions and not well informed about modern developments. Shortages in hospital beds for general illness, tuberculosis, and mental disease prevail in every rural State. The institutions available are often under proprietary management and not freely open to low income groups. Enormous lacks of proper environmental sanitation, in both the open country and in rural villages, exist in nearly all the States.

Most of the States recognize the problem as fundamentally economic. Along with the need for increased purchasing power, most States stress the need for education in healthful living and in the proper use of medical resources. All States that have made reports on the rural housing question call for some action by the Government and stress the importance of local participation by voluntary groups.

The extension of prepayment or insurance plans to cover the cost of medical services is almost universally recommended by the States. Patterns developed in the group-health plans of the Farm Security Administration for low-income farmers and in the Blue Cross plans for group hospitalization are widely approved. While the accent is mainly on the development of local plans on a voluntary basis, about one-fourth of the States speak directly in terms of including medical and related services for farm people in Federal social security legislation. This group of States points to the economic inability of certain States to provide decent health insurance coverage unassisted and to the failure of the purely voluntary approach to protect those in greatest need. All States that have considered the special problem of subsistence-income groups indicate the need for some Federal subsidy for health on this income level.

In the past a number of States have carried on extensive programs for preventing farm accidents and fires, and they have plans for the future expansion of these activities. The data on farm accidents and fires show thousands of skilled workers lost through death, disabling injuries, and fires, with corresponding losses in production, harvested products, and facilities. Thousands of young men and women are physically handicapped as a result of accidents, and are consequently unacceptable for service in our armed forces.

Recommendations of Many States

Most States call for the construction of rural hospitals, with State funds, Federal funds, or a combination of State and Federal funds.

Health centers as places to house health departments and possibly physicians' offices and technical equipment are widely recommended. Many States contemplate the organization of a network of hospitals and health centers whereby difficult cases can be systematically referred from outlying to central institutions. Sanitation projects supported out of Federal, State, and local funds, and utilizing the

legal mechanism of the sanitary district are advocated. The importance of prepayment plans to insure the financial maintenance of rural hospitals is stressed by several States.

Practically all the State reports recommend the extension of public health services. A system for more efficient districting of units of local health administration so that every rural county may be covered by an effective full-time unit is frequently advocated.

To provide physicians and dentists for rural areas, a few States call for some type of Federal program to redistribute available personnel. Some States recommend medical school fellowships requiring subsequent practice in rural areas. Some advocate subsidy of practitioners by local communities. Relaxation of license barriers between the States is frequently advocated. In general, the attractions provided to practitioners by guaranteed income from health insurance plans and by modern hospital facilities are recognized.

To improve the quality of medical services to rural people, a number of States call for the extension of postgraduate education. To bring the services of specialists to rural people, several States suggest the promotion of "group practice" clinics.

Taken as a whole, the State activities in rural health and sanitation provide the basis for an extensive program of rural health improvement. The protection of the farmer's health and the treatment of disease are recognized as a responsibility of the entire community, rather than a luxury dependent upon individual income.

A number of State committees contemplate independent State programs for the prepayment of services, for hospital construction, and for the extension of public health services. Other State committees recognize as their main function the enlightenment of farm people on the extent of the problem and on possible solutions. Evidently farm people are looking increasingly to Government agencies for positive action to bring them the benefits of medical science.

FARM HOUSING PROBLEM

Programs for improved farm housing must consider the extent to which farms provide effective opportunities for it, based preferably on farm-income resources sufficient to pay operating expenses, cover family living expenses, and provide for necessary capital expenditures or debt payments. If the resources of a farm are not sufficient for this purpose, some employment off the farm must be available to the farm family. Otherwise, farm housing improvement lacks a proper economic foundation.

From this standpoint, four classes of farms can be recognized: (1) Farms capable of providing the operator with effective full-time employment; (2) farms not adequate in themselves but situated so that work on them can be combined with off-farm work (part-time farms); (3) inadequate farm units occupied by retired farm families; and (4) other inadequate units. This fourth group is the largest; in fact, it comprises over 50 percent of all the units in our national farm plant. Families in it cannot earn a satisfactory living, including adequate housing.

Study of the farm-housing problem has thrown light on the number and the proportion of farms in each of these classes, and also the kind of dwellings they have now. Extensive though not complete data have been obtained. It has become evident that an adequate farm-housing program cannot be identical for the different classes of farms above mentioned, but must develop different methods for the different groups.

Main Suggestions Offered

Broadly, the suggestions offered are as follows:

1. For farms with adequate employment opportunities (groups 1 and 2) a much-enlarged credit program is required.

a. Private institutions should be encouraged to offer credit on favorable terms with the loans possibly guaranteed by the Government in a manner somewhat similar to Federal Housing Administration insurance of urban housing loans.

b. More credit should be made available for housing repair and reconstruction and for the addition of needed facilities. For such purposes it might be feasible to provide direct Government loans on valuations determined by careful income appraisals.

c. Refinancing should be encouraged on similar terms.

2. For retired farm families, credit should be made available on similar terms where such families have sufficient regular income. Where they don't have sufficient regular income, part of the cost of house repairs, additions, or new facilities might be borne by the public with safeguarding provisions, as one feature of a security program for farmers.

3. For families on inadequate units, the desirable remedy for inadequate housing requires adjustments to make the farm units adequate. This transformation might be accomplished in many cases through a supervised credit program for farm consolidation and improvement, with rehabilitation and guidance features. Where a definite basis exists for believing that an adequate unit can be thus created, home-improvement loans should accompany farm-operating loans. If substandard houses must be occupied pending such adjustments, Government funds should be available to finance essential depairs. Where no opportunity exists for transforming inadequate farm units into adequate ones, the occupants should be helped to find other employment.

PLANNING RURAL PUBLIC WORKS

From the beginning of the Department's post-war planning activities it has been recognized that a public works program may be necessary after the war to provide employment. In May 1941 the Secretary of Agriculture charged the Department's post-war planning committee with responsibility for outlining a possible public works program in the agricultural field. This Department and other Federal agencies had already been engaged, under Executive Order 8455 and under the Employment Stabilization Act of 1931, in developing 6-year programs of Federal public works for combination into the

"shelf of projects." The President re-emphasized the importance of this activity on May 22, 1943, when he issued a memorandum to the heads of Federal departments and agencies which reasserted the "shelf" policy and stressed the need of advance planning, so that Federal agencies would be ready to proceed with their programs when the time for action comes.

Specifically the memorandum asked the departments and agencies to submit estimates to the Bureau of the Budget for the appropriations required to cover surveys and related planning work. In accordance with this memorandum agencies of this Department were asked to prepare estimates. Meanwhile, Executive Order 9384, issued October 4, 1943, made public works planning and programming an integral part of the budget process and required all requests for construction funds to be justified in terms of an over-all plan. In line with these directives the Department on December 14, 1943, submitted to the Bureau of the Budget a summary list of projects which would contribute to an over-all post-war rural works program. The estimates contemplated a planning program for 1½ years to provide public works projects for approximately a 3-year period. Simultaneously, the Department's bureaus and agencies were asked by the Secretary to take up the work of detailed project planning within the limits of funds already available.

Some of the regular activities of the Department fall within the scope of a possible public rural works program—for example, work in forestry, soil conservation, rural electrification, water developments, and flood control. Several of these activities have played an important part in past rural public works programs. It is consequently important to review them, and to evaluate the related policies and procedures, so that the experience can be applied to future works programs. Hence a working group of the Department's interbureau post-war planning committee has been created to study the record and make recommendations as to future rural public works programs.

Policy Matters Awaiting Clarification

It may be useful to mention some of the policy matters that need clarification. First comes the place that rural public works should have in an over-all public works program. Next is the question of the employment policies and the worker-recruitment policies that should be adopted for public works projects. Then there is the question of improving upon the administrative and financial arrangements used in past programs. In addition the Department has an important interest in public works programs for which it may not itself be responsible, such as programs for housing, highway construction, provision of educational facilities, and provision of medical facilities. Action in these fields is important to agriculture both as a means of contributing to rural welfare and as a means of maintaining employment. The Department hopes, by correlating its own experience with probable over-all requirements in the public works field, to be in a position to recommend substantial improvements in policy and procedures.

MARKETING FACILITIES IN PUBLIC WORKS PLANNING

The Department is taking steps to determine what types of marketing facilities might be included in a post-war public works program. It is gathering information that can be used in planning projects. Programs could usefully be undertaken in many localities to provide modern, efficient, and adequate marketing and distribution facilities. Also the Department is endeavoring to gage the extent to which local groups may be expected to take advantage of a public works program of this type, and to cooperate with it, should one be developed.

Benefits would be direct and indirect. Among the direct benefits would be reductions in the cost of handling agricultural products, particularly perishables such as fruits and vegetables, and a narrowing of the spread between prices received by producers and prices paid by consumers. In New York, for example, nearly half the consumer's dollar for fresh fruits and vegetables goes to pay the cost of moving these products from the city limits to the consumer's kitchen. Among the indirect benefits would be a reduction of spoilage and waste, which result in heavy losses annually.

As part of its post-war planning program, the Department is making a study of marketing facilities in nearly 100 cities. It is finding out, with as much precise detail as possible, the extent to which existing facilities for grading, packing, loading, standardizing, and shipping products need to be expanded or improved. Its investigators are cooperating with State agencies, with local officials, and with many farmers. A report on facilities for handling fruits and vegetables and a similar report on poultry and eggs are in preparation. It may be possible later to evaluate facilities for handling livestock, cotton, grains, and tobacco.

The need for improvements in our marketing and distribution system for perishables is generally recognized. The information that the Department is gathering will be useful even if we do not have a public works program in the post-war period. It will be ground work for any action that may be taken to improve our marketing and distributing facilities.

IMPROVEMENT OF CROPLAND AND PASTURE

Efforts by farmers to increase their production as a means of helping to win the war have added to the difficulty of fighting erosion and loss of soil fertility. When the war is over it will be important to overcome this set-back to conservation. Hence the Department and cooperating State agencies have started to outline a program for cropland and pasture lands with the general purpose of combining maintenance of adequate farm living with improved use and care of the soil. The States have analyzed their current situation, indicated what problems will be present in post-war years, and offered recommendations for dealing with these problems. Taken together, the State reports emphasize requirements that almost all parts of the country will have to some extent in common. Further study will

develop more specific recommendations for each State individually and for different subareas within each State.

Broadly, the measures recommended in the State reports fall into two main categories; one dealing with capital improvements, and the other with related measures. For the most part, the capital improvements recommended, which require considerable use of labor, materials, and equipment, will become a part of normal farming operations and they will conserve and build up soil resources. Included by nearly all the States is emphasis on need for drainage and irrigation, along with other measures such as terracing, reforestation, pasture improvement and revegetation, gully-control dams and plantings, liming, and the like. Common to practically all the States under the heading of cropland and pasture-land care, as an important measure related to capital improvements, are crop adjustments. For example, some counties in the Corn Belt have from 70 to 80 percent of their cropland in corn and soybeans; this is excessive for conservation farming. All areas record instances in which the war effort has cut into approved conservation practices.

It is worth noting, incidentally, that many of the State reports mention the relation that prices for crops, livestock, and livestock products will have to crop adjustments and pasture utilization in the post-war years. Favorable prices will promote necessary acreage adjustment, while unfavorable prices will hold it back. If prices remain reasonably remunerative, farmers will be able to follow recommended plans for soil and water conservation. They won't be under pressure to rob the soil. Low prices, on the other hand, will make farmers reluctant to reduce their acreage of soil-depleting crops, since the combination of reduced prices and reduced production will involve a heavy sacrifice of income. Hence the outlook for post-war conservation of cropland and pasture land has a close connection with the outlook for post-war crop prices.

Conservation Districts Strongly Endorsed

Most of the States warmly endorse the soil conservation districts which have been organized by farmers in recent years, and which are receiving Federal and State assistance. Many States urge increased Federal, State, and local cooperation with soil conservation districts and recommend organization of additional districts. They specially appreciate the "on-site" technical assistance which the districts furnish. This type of help will probably be requested to an increased extent when peace turns farmers' thoughts back to peacetime ways of farming. Most of the State reports recognize and recommend expansion of extension education work in soil matters. This service is just as important as material and technical assistance to farmers who want to check erosion, build up soil fertility, and improve their crop yields and pasture lands. The States also recommend expansion of research with regard to needed crop and pasture land treatments and management. Fulfilling the necessary details of a cropland and pasture-land improvement program is largely a job for the well-informed individual land user.

EROSION CONTROL ON FARM LANDS

Although more farms have carried out more erosion control and fertility maintenance and improvement practices during the 3 war years than in any previous comparable period, the number of acres of land devoted to soil-depleting uses has likewise increased. The result has been the reduction of erosion and fertility losses on the lands receiving conservation treatment and at the same time the exposing of additional acres to erosion and fertility loss.

The acreage of the 52 most important planted crops increased from 342,000,000 acres in 1939 to 360,000,000 in 1943, and was further increased to 368,000,000 acres in 1944.

The intensified use of lime, commercial fertilizers, and organic material by farmers has helped minimize exhaustion of plant nutrients in the soil.

In the 10 years from December 1933 to December 1943, 4,000,000 acres of cropland were retired from cultivation cropping and put in range, pasture, permanent hay, and other appropriate agricultural uses. Taken out of improper uses, put into productive and economic uses, and protected against erosion and against exhaustion of soil fertility, this land has added greatly to the Nation's agricultural strength.

In the 2½ years from December 1941 to June 30, 1944, the acreage of farm lands which had complete plans for conservation and on which the operators were making yearly progress toward attainment, increased from 35,693,663 to 65,084,560. This addition of 29,000,000 acres to the farm land in process of being protected is an especially notable gain in that it was achieved in wartime and has contributed to more intensive production.

Moreover, no widespread plow-up of land unsuitable for cultivated crops such as developed during and after World War I has occurred. Observations in various parts of the country and particularly in the Great Plains show that this is so. Farmers have realized that, with efficient farm practices, they can get the required high production without starting a destructive plow-up. They are aware of the hazards such a plow-up would involve, because they remember the aftermath of the plow-up in the World War I period.

Optimistic as these facts are, however, they do not tell the whole story. Danger to the soil is not over; the country has not done all that is necessary. Most of the land damage attributed to World War I, it should be remembered, actually occurred after the war was over. Moreover, we should bear in mind that the 65,000,000 acres now in complete conservation work represents only a minor part of what must be done.

The Record of Erosion Control

Some 300,000,000 acres or more of United States farm lands have been damaged and are being further damaged by erosion. This area includes: 50,000,000 acres of formerly cultivated land forced out of production by excessive erosion; another 50,000,000 acres so severely damaged that it invites abandonment; about 100,000,000 acres eroded

by wind and water, so that half the topsoil is gone; and an additional 100,000,000 acres on which erosion is taking the topsoil inch by inch.

The Soil Conservation Service's inventory of the Nation's farm land indicates the size and nature of the task ahead. This inventory shows that—

Forty million acres of land unsuited for cultivation should be shifted to grazing or woodland.

Thirty million acres of land require drainage.

One hundred million acres should be protected by terraces.

One hundred and twenty million acres need the protection of contour cultivation.

Ninety million acres should be planted to strip crops.

Two hundred and sixty million acres need crop rotations or improvement of rotations.

Twelve million acres need repair or improvement of farm irrigation systems.

One hundred and twelve million acres of pasture and range need lime and fertilizer.

One hundred and thirty million acres of pasture and range need reseeding, fertilizing, and liming.

These are the major needs and the major practices, though conservation farming may also require numerous other practices.

Permanent Nature of Erosion Problem

This task must be largely a post-war undertaking; yet it is not a task created by the war. It would have had to be done in any event. It is a long-time project which must be well planned. Farmers have direct supervision, through local farmer-controlled soil conservation districts, over the application of conservation measures to the land. As of July 15, 1944, there were 1,122 of these soil conservation districts in 45 States. Soil conservation districts are now making inventories of their conservation needs, on an individual farm basis, with estimates of the labor requirements. When completed, these inventories will provide a basis for coordinated Nation-wide activity in soil conservation.

The Soil Conservation Service is preparing to give broader technical assistance to the soil conservation districts. Typical of current conservation research is recent study in raindrop erosion carried out by the Soil Conservation Service at the Coshocton, Ohio, experiment station. Using devices which can produce almost any kind of weather, from a gentle drizzle to a drenching downpour and tilting plots of soils of various types, soil scientists found that the impact of individual raindrops dislodges more soil than water rushing over the surface of the ground. This discovery provides a basis for planning cropping systems, and emphasizes the importance of cover crops.

Standard practices which make up the major part of the conservation program fall in two classes: (1) Protection, rebuilding, and maintenance of the soil, and (2) increase of crop yields and farm production in general.

Farmers testify to the results in both categories. Recently, 9,244 farmers who operate 3,900,000 acres furnished the Department with their own estimates—98.2 percent said the soil and moisture conservation work was effective in controlling erosion on their farms; and 96.6 percent said it was effective also in increasing their production.

IMPAIRMENT OF WESTERN GRAZING LANDS

We have seriously impaired the productive capacity of our western grazing lands. An overoptimistic estimate of the number of livestock the range can carry safely has been a cause of too heavy stocking. Drought, fire, and the competition of game animals and rodents for forage have added to the damage. The problem has been accentuated by a rapid increase of the livestock population to an all-time high, made possible by favorable weather conditions, high prices, and wartime demands for livestock products. The overload has reached dangerous proportions. For example, the six northern Plains States have probably 25 percent more livestock than their forage resources can safely support over a period of years. In many of the other Western States the disparity between livestock numbers and forage and feed supplies is even greater. If our forage resources are to be safeguarded, and our production of meat and other animal products sufficiently maintained in the post-war period, large adjustments must be made in the peak numbers of cattle now on western ranges.

Adjustments in land tenure are needed in Western States to facilitate more efficient use of range resources. Over much of the western range the ownership pattern includes blocks of mountainous summer range in national forests, with some private and State land interspersed, and a checkerboard of Federal grazing district, State, and privately owned lands. The State lands are widely dispersed, mostly in 640-acre units. Much of the privately owned land belongs to railroads, lumber companies, and other absentee owners. Ranch operators frequently lease it, but with little assurance of continued occupancy. Considerable tracts are in broken holdings, often the vestiges of former homesteads. This scrambled, unplanned pattern of ownership gives rise inevitably to problems of overstocking, discriminatory control of water resources, and other abuses. It is a major obstacle to efficient utilization and conservation of the range.

Blocking up of public-land holdings into larger units will help to solve the problem. This procedure, which has proved useful already in some areas, should be applied more widely. It simplifies the tenure pattern by reducing the number of agencies with which the range operator must deal. Shift to public ownership of lands that are unsuited to permanent private ownership is an additional means of promoting more efficient range operation. In other localities it may be desirable to assist individual ranchers in acquiring units large enough for efficient operation. Establishment of tax rates more nearly in line with the productive capacity of range land is necessary in many areas.

Some Things Required to Build Up Ranges

Other things need to be done to build up the range and to increase its productivity, and range States are studying the requirements in detail. Each State has made estimates, for example, of the areas where special action is necessary to halt accelerated erosion of the areas that need reseeding, of the areas where noxious plants grow, and

of areas that require additional fencing and water developments. On privately owned lands individuals will do much of the necessary work, as soon as labor, materials, and other facilities become sufficiently available. On public lands, or where public values are involved, public works programs may be required.

Western farmers and ranchmen are becoming increasingly aware of the need for conserving the range and are taking action themselves to conserve it. They have cooperated extensively, for example, in organizing soil conservation districts. There are now 498 such districts, embracing 317,000,000 acres, in the 17 Western States. Formed in many cases through the efforts of livestock associations, these conservation districts are proving an effective means of adjusting numbers of livestock, improving land-tenure conditions, and making range improvements.

MAIN NEEDS IN POST-WAR FOREST CONSERVATION

How this country can meet high demands for wood products, without further endangering the productivity of its forests, is a problem in forest conservation which has long been of vital though often unrecognized public concern. It has been accentuated and given new meaning by the war, and figures importantly in the Department's post-war planning.

Our saw timber has declined almost 40 percent in volume in the last three decades. Annual saw-timber growth, largely dependent on volume of growing stock, is little more than half the current drain. Private forests, which supply about 90 percent of the present cut, are largely not under conservation management. Many owners practice good forestry; nevertheless, by far the greater part of private cutting is without conscious regard for maintaining productivity. About 80 percent of commercial forest land has been cut over, and much of it now produces only a fraction of what it could produce; 17 percent is virtually nonproductive. Watersheds, range, and other important forest values have also deteriorated through misuse or neglect.

The war has levied a heavy toll on our timber resources and will leave large unfilled civilian demands. Generally speaking, destructive cutting and depletion trends have been stepped up. Moreover, the outlook is for continuing heavy demands in the years ahead.

Domestic saw-timber requirements for the first 5 post-war years are expected to average about 30 percent above pre-war (1936) consumption. Substantial quantities may be needed abroad. Europe's deficit, for example, may be more than can be readily supplied from other parts of the world. These requirements, and future new uses at home, will doubtless add to the pressure for continued heavy output from our forests.

Planning for ample timber output in the immediate post-war period is inseparable from the larger problem of meeting long-pull requirements on a sustained, fully adequate basis. Its aims are also closely allied with the companion need to improve watershed protection and

strengthen other essential services. Several major lines of action are indicated:

1. Foremost is the problem of stopping destructive practices on private forest lands. Effective public regulation seems the only positive solution. A necessary corollary is public ownership of all forest land which cannot be given reasonably adequate management under private ownership.

2. Rehabilitation of idle and partially productive forest land is an urgent need. Several approaches are involved: A comprehensive forest restoration and development program; intensified protection from fire, insects, and disease; and various public aids to private owners. Large-scale public works, including forest cultural treatments and structural improvements, are needed. This work, although justified on its own merits, can help substantially in maintaining full employment during the post-war transition period. It can provide many jobs for war veterans and others, and furthermore can contribute in unique ways to health conditioning, youth training, and other desirable objectives. Estimates indicate that national forests alone can provide half a million man-years of useful employment on authorized activities. Detailed plans and specifications are being prepared as rapidly as war work and other commitments will permit.

3. More complete and efficient wood utilization will enhance the usefulness of our timber supplies and help to narrow the gap between growth and drain. Waste, which accounts for more than three-fifths of the volume of all trees cut, can be greatly reduced through chemical conversion and other technological processes which have been stimulated by the war. New outlets must be found for unmerchantable species and for the defective or undesirable trees that dominate many timber stands. This requires definite action, including enlarged forest-products research; pilot plants for commercial demonstration of new processes and products; improved utilization of road systems; and better integration in manufacturing. More education and technical services are also important.

International Policies in Timber Trade

International timber-trade policies, along with other aspects of world trade and world reconstruction, will influence our post-war forest situation. Important issues are: (1) Whether this country can safely supply wood exports in substantial quantities over and above our heavy domestic requirements; (2) what our policies should be with respect to timber imports; and (3) whether the United States should assist in developing foreign sources of timber.

Basically, such questions reflect the serious extent of forest depletion in this country and the difficulties of balancing the Nation's timber budget at a high level. They will be partly answered or at least simplified by prompt action to stop forest destruction, reduce waste, and increase forest growth.

FARMERS' INTEREST IN SOCIAL SECURITY PROGRAM

The insurance features of our social security program are not applicable to farmers or to self-employed persons in other occupations. Proposals are now being made to extend the program to the self-employed including farmers, and to expand the benefits for medical and hospital care. Farm people themselves must decide whether or not they want to participate. They can have the benefits of the present social security program, and of an expanded program, if they want them.

Ways are already worked out by which farm people could secure these benefits. The Social Security Board is required by the social security law to study such problems. It has been doing so ever since it was established. During the last year it has been working closely with a group in the United States Department of Agriculture, and giving careful consideration to how the program can be modified so as to include farmers if farmers want to be included.

Apparently most farmers don't know what the social security program is, and have no sentiment for or against it. Some of them think it is only a hired man's program or a program to care for the indigent. The great need is to furnish accurate information to farm people on what the social security program is, what plans have been worked out to make it feasibly applicable to farm people, and what needs of farm people it would meet. Post-war planning of social security for farm people at this stage largely means helping to inform farmers about social security programs.

It is clear from State reports that many people in the land-grant colleges and in the farm organizations want more information about the social security program, and about the various elements of insecurity to which farm people are subjected.

In the scientific field the United States Department of Agriculture and the land-grant colleges have wide experience. Applying their experience to economic and social problems requires the help, of course, of State officials, farm organization leaders, and others who have close contacts with the farmers.

Social security does not attempt to create a new economic system, but simply brings insurance principles to bear on welfare problems. It attempts to stabilize the lives of individuals and families, and in that way to stabilize the whole economic and social system. It can have importance equal to that of international trade, taxation, production, or marketing. Farm people may discover they can get great advantages from it.

RURAL ELECTRIFICATION

Under the stimulus of wartime necessity for increased food production, the Federal rural-electrification program moved ahead at a faster pace during the fiscal year 1944. During the preceding year the War Production Board adopted the policy of authorizing extension of electric service to farms which met certain basic requirements. That

such extensions contributed to increased food production is shown by numerous farm-operation reports in which farm-production increases are attributed to the use of electrical equipment installed in accordance with WPB requirements.

The WPB regulations provide various ways in which farms may qualify for the extension of electric service. By far the larger number of these extensions are built under regulations which require the farmer to have at least 1 animal unit for every hundred feet of line construction necessary, and a minimum of 5 units. The basic animal unit for this purpose is 1 dairy cow; equivalents are 75 laying hens, 3 brood sows, 30 breeding ewes, or other combinations. Extensions up to 5,000 feet may be approved by the County Agricultural Conservation Committee. Longer extensions are subject to specific individual approval by the War Production Board, and many such applications received approval during the year.

At the end of the fiscal year 1944, REA borrowers were serving 112,179 more consumers than at the beginning. This contrasts with 60,628 new connections made during the preceding year. On June 30, 1944, the borrowers were serving 1,152,000 consumers in 46 States, Alaska, and the Virgin Islands. They were operating 398,000 miles of rural lines—enough to span the earth at the Equator about 16 times. Of the 16,353 miles added to the REA-financed distribution systems during the year, the major part was built by cooperatives harassed by wartime shortages of labor and material.

Lending operations by REA paralleled, of course, the increase in activities of the REA borrowers. The following figures illustrate the growth in volume of this phase of the Agency's activities.

	Loan funds allotted	*Loan funds advanced*
Fiscal year 1943, gross	$8, 230, 062	$14, 536,572
Fiscal year 1944, gross	33, 666, 888	18, 478, 087
Total to June 30, 1944, net	498, 811, 446	387, 630, 669

Electricity as Production Aid

The Tri-County Electric Cooperative, at Azle, Tex., reported that newly connected farms were able to increase their milk production by 34 percent and poultry production by 50 percent although the labor shortage in their area had become more acute.

Thirty-two Minnesota farms, which had a total of 379 cows before they obtained electricity, reported a total of 538 milk cows after they received power under war-service regulations. Thirty-one hog farmers on the same lines reported that they would step up their annual hog production from a total of 1,900 hogs a year to 2,700; and 4,990 laying hens on 32 farms were being increased to 7,900.

These figures merely hint at the total increase in production effected by use of electricity on 2,500,000 of the country's farms. Electric brooders raise healthier chickens; electric pumps provide plentiful water to hen houses and dairy barns. Water pumped to stalls, according to studies made, can result in an increase of from 8 to 15 percent in the milk production of a dairy cow. Similarly, fresh, easily accessible water in the hen house increases egg production. Electric

pig brooders show a saving in feed, because, with their use, the litters are larger and healthier at market time.

Farm Families Predominate as REA Consumers

Of the 1,152,000 consumers of the REA-financed systems, 886,000 are farm families. The rest comprise other rural residences, rural industries, schools, churches, flying fields, war training bases, mines, locker plants, and many other types of public service and industrial enterprises.

During the first years of the war the REA borrowers received numerous applications for power service from war agencies and from Government-financed plants. In 1944 the number of power applications was nearly as great as in former years, but the emphasis has changed. The majority of the industrial power-load applications received by REA borrowers now are from establishments processing farm products. Industrial users individually have increased their consumption of power, indicating an increase in the scope or tempo of their operations.

Main REA Programs

This agency has continued its program of financing the acquisition of certain existing electric facilities when such action makes it possible eventually to provide a greater degree of area coverage. This activity, of course, is incidental to lending funds for new construction, household wiring, and the other purposes provided for in the Rural Electrification Act of 1936.

The work of REA is not confined, however, to financing its borrowers' activities. It must safeguard the loans already made. It has made loans to 879 borrowers; and REA offers assistance to them in matters of engineering, office management, power generation, public relations, personnel, accounting, and law.

The major part of REA's loans were made to cooperatives newly organized. Most members of these cooperatives had never participated in such an enterprise and required instruction as to their responsibilities. REA has offered constant guidance to members, directors, and officers in making their cooperatives successful.

An essential service of the REA staff, during wartime, is to interpret war regulations to the Agency's borrowers and to aid them in securing priorities for materials necessary to maintain the power lines in continuous service and to make new service connections under appropriate regulations. It has utilized the services of other agencies of the United States Department of Agriculture and of the War Food Administration, which has served as the claimant agency for such materials.

Operational problems of the borrowers have increased under the stress of war. Borrowers have experienced a considerable turn-over of their personnel, not only of bookkeepers, linemen, and clerical workers, but of managers. One hundred and thirty-four REA-financed systems hired new managers in 1944. REA has conducted schools about the country to provide bookkeepers with training for

their work. During 1944 it held 26 such schools, each offering a concentrated short-term course of less than a week's duration in bookkeeping problems affecting an REA cooperative.

As farm users of electricity learned how electricity could take the place of a son or a hired man gone to war, their kilowatt-hour consumption increased. The following figures indicate the increased use made of electric power for nonindustrial purposes, as farmers became accustomed to their new electric equipment. The average monthly consumption for residential systems operated by the Rural Electrification Administration, predominantly on farms, was 59 kilowatt-hours for those that had been in operation for 1 to 3 years, 72 for those in operation from 3 to 5 years, and 89 for those in operation more than 5 years.

Consumption of Electric Power on Farms

During the early years of REA it was thought that farmers would eventually reach an average consumption of 100 kilowatt-hours of electricity per month. Today numerous REA borrowers report an average in excess of 100 kilowatt-hours. Many managers are anticipating an average in excess of 200 kilowatt-hours per farm per month when farm freezers, ultra-violet and infra-red rays, the electric eye, and the host of other wonders that the post-war world has in store for us, are put to work.

In 1944 power amounting to approximately 1,800,000,000 kilowatt-hours was billed by the REA borrowers. This compares with 1,460,460,571 kilowatt-hours for 1943. Ninety percent of the power billed was purchased from private utilities or public power agencies. The rest was generated by 65 REA-financed systems.

The REA Debt-Service Record

The debt-service record of REA borrowers continues good. Schedules called for the repayment of $58,482,400.52 in principal and interest by the end of the fiscal year. Actual payments of principal and interest totaled $74,970,219.66, including $16,807,254.54 in prepayments. In addition, many of the cooperatives had substantial bank balances and investments in war bonds. Total delinquencies of over 30 days amounted to $277,387.31. Many REA borrowers, in common with all utilities, have had to defer some planned maintenance because of the wartime shortage of manpower or materials, and this, in part, accounts for the heavy prepayments. Normal maintenance and replacement expense will increase as the lines age; post-war extensions will decrease, at least temporarily, average revenue per mile. The cooperatives, therefore, consider their prepayments as a "cushion" against future contingencies.

Scope for Rural Electrification

Rural electrification can play an important part in our peacetime economy. The United States must mobilize resources, ingenuity, and determination to make America a happy and prosperous country for

returning soldiers and for all the people. Many steps will be required if rural people are to enjoy a good standard of living, if jobs and security are to be available to all who wish to work, if industry is to flourish and expand. One step is the vast expansion of rural electrification, which was brought almost to a standstill by the war effort. The country has only scratched the surface of rural electrification possibilities. According to estimates, there are still 7 million farm and rural nonfarm homes without electricity. Of all the services to farmers which have gone a long way toward making farm life more pleasant, by far the most helpful is rural electrification. Farmers in many areas, through REA developments, can have almost every electrical appliance any city home has. In addition, they can have electric pig brooders, electric water heaters for livestock, and water piped to every field on the farm.

Basic Principles of Rural Electrification

Certain fundamental principles must underlie the expansion of rural electrification: (1) Rural homes need electricity as much as city homes, if not more; (2) the furnishing of electricity to farmers must be an opportunity for service to agriculture rather than a means of making a profit; (3) REA cooperatives are the best means of getting electric service to the maximum number of rural people at the earliest date. More than 800 cooperatives are organized and serving more than 1 million farm homes. The task now is to coordinate construction plans as rapidly as possible.

No one should be permitted to build lines which will serve only the part of an area that will show a profit and in that way make it impossible to serve the rest of the area without a loss. Surveys are being made by utilities with a view to erecting in lucrative territories lines that would bar future REA developments. The Pace Act (Public 425, 78th Cong., approved September 21, 1944) will help to prevent this kind of development and to assure development of REA lines.

PROGRESS OF FARMERS' COOPERATIVE ASSOCIATIONS

In the post-war period farmers' cooperatives will continue to play an important role in the assembling, processing, and marketing of farm products, in the purchasing of farm supplies, and in the provision of necessary farm business services. The extent to which cooperatives have developed in American agriculture may not be realized by persons who have followed the movement only casually. Cooperative associations in this country now constitute one of the most important groups of farmers' organizations and have a considerable part in the economic life of American farm people.

Types of farmer cooperatives in this country and the number of members served may be summarized as follows: There are about 7,700 marketing cooperatives, with 2½ million members; 2,750 purchasing associations, with 1½ million members; 1,900 farmers' mutual insurance companies, with 3 million members; 800 or more rural electric power cooperatives, with 1¼ million members; 2,500 mutual irrigation

companies, with 175,000 members; and 2,000 or more farmers' mutual telephone companies, with one-half million members.

Associations providing credit and production services should be added to the summary. In the group that provides credit, services are some 2,800 national farm loan associations, more than 500 production credit associations, and about 370 rural credit unions. In the production field are close to 4,800 livestock-improvement organizations—sire associations, dairy herd improvement associations, and an increasing number of artificial-insemination associations. There are also several thousand small informal cooperative groups, such as threshing rings, spraying rings, and many others, which help to hold down the farmers' production costs.

Role of Cooperatives in Post-War Programs

Cooperatives are a means to an end and not an end in themselves. They exist for the purpose of increasing the efficiency of production and marketing, and consequently of bringing greater returns and a higher standard of living to farm people. This also is an aim of other post-war agricultural programs. Cooperatives offer a medium, therefore, through which post-war agricultural programs generally can be brought to the attention of farmers and through which farmers can participate in such programs. Thus the farm cooperatives represent one of agriculture's most valuable assets for peacetime readjustment. They have the organization to transmit information quickly and accurately to farmers, and to collect information from them. They have a big investment in physical facilities for assembling, handling, processing, storing, and selling farm products, and also for purchasing farm supplies and providing farm business services. Obviously, our post-war agricultural program should not fail to make use of these farmer-owned facilities.

In any post-war program set up specifically for cooperatives one objective would be to increase their operating efficiency. Another would be to determine new fields of cooperative activity and new types of cooperative services. Cooperatives that heretofore have been strictly marketing associations might want to take on the purchasing of supplies for their members. Cooperatives that heretofore have been strictly purchasing associations might contemplate entering the marketing field. Local associations might join together in federations in order to do selling or buying in a broader way or to take on other functions. These are matters for the members to decide.

In appraising the accomplishments and possibilities of cooperatives in the post-war period their limitations should be recognized. For example, cooperatives have little or no influence on the general price level or general economic conditions. Nor do they typically exercise control over the total quantity of farm products produced. Cooperatives adjust themselves to supply and demand and to price levels within the competitive system, but through their operating economies they frequently become "pace setters" in reducing distribution costs and in improving trade practices.

Cooperatives offer opportunities for material aid in the administration of any national program involving marketing, processing, storage financing, and the performance of other economic functions. Farmer participation in these programs can be made more effective through cooperatives which represent the farmer in marketing and purchasing and the performance of other business services.

In the post-war period there will be more need for producer cooperatives among small farmers, and also more need for marketing and purchasing cooperatives among all farmers. For many years there has been much talk about farmers having more control of their own business affairs. Also there has been an increased demand for holding down the margin between producers and consumers, so that both groups will benefit. Farmers' marketing and purchasing cooperatives offer a definite means of reaching these objectives. The cooperative movement is under strong attack today from certain quarters. The reason for this attack appears to be the fact that the cooperative movement has been growing rapidly during recent years. The attacks are made upon what is said to be an unfair advantage that cooperatives have over other forms of private enterprise, due to the fact that patronage refunds of cooperatives are not subject to taxes in the same manner as profits from corporations. There can be no ground for this criticism in the true cooperative, because the true cooperative is not organized to make profits and, therefore, cannot be subject to a profits tax. Patronage refunds based on the amount of business done with the cooperative cannot be put in the same class as profits made from an investment in a corporation.

UTILIZATION OF SYNTHETIC AMMONIA PLANTS

The Government has participated in the expansion of the synthetic ammonia industry by constructing a number of plants during the war. It must decide on the disposition of these plants after the war. The Department's committee which has been studying the problem recommends that some of the Government plants should be utilized after the war for the production of granular ammonium nitrate or other nitrogen fertilizer. It believes demand for nitrogen fertilizers will continue high for some time.

Specifically, whether the plants are operated by the Government or by private industry, the committee recommends the conversion of nearly 40 percent of the total nitrogen capacity of the Government plants for post-war production of granular nitrogen fertilizer, ammonia and its derivatives. Such conversion would help to meet requirements both of agriculture and of industry. The remaining Government plants, in the opinion of the committee, should be maintained in stand-by condition for military use. In that position they would also be available for meeting unanticipated demands for industrial or agricultural nitrogen.

On stated assumptions with regard to national and farm income, prices, and soil and crop needs, the committee has estimated post-war nitrogen requirements. It estimates fertilizer nitrogen consumption

annually under relatively unfavorable conditions at 500,000 tons of nitrogen. The amount could increase to 750,000 tons under favorable conditions, and to possibly 900,000 tons under the most favorable conditions. Industrial consumption is expected to be between 175,000 and 300,000 tons of nitrogen.

Under favorable or most favorable conditions, the estimated demands will require very substantial production from some of the Government plants, in addition to capacity production of private plants and also substantial imports from Canada and Chile. Operation of some Government plants for fertilizer production in the post-war period will continue as in wartime. Surplus War Department ammonia has been diverted to the production of fertilizers. This diversion has made possible a substantial increase in the use of nitrogen fertilizers on 1944 crops.

There is an immediate demand for more granular nitrogen fertilizer, because of its relatively low cost and its convenient solid form. Therefore the committee suggests that some of the Government plants be equipped to produce such fertilizers by modern methods. This will require a considerable investment, for none of the plants have such equipment at present. Equipped in the manner proposed, however, the plants could produce improved fertilizers from surplus ammonia at lower than present costs and the change would not interfere with the military use of the plants. It would simply put them in a position to make the best use of surplus ammonia and would also be a step in their conversion to meet post-war needs.

Conversion of about 40 percent of the capacity of the Government plants for the production of civilian requirements would give the country a fixed-nitrogen capacity of about a million tons. In addition, the Government would have a number of synthetic ammonia plants of very substantial production capacity as part of its military establishment. Held in stand-by condition, or operated to meet unanticipated civilian requirements, these plants would have high reserve value.

Granular ammonium nitrate is the nitrogen fertilizer that can be produced most readily at several Government ammonia plants. It is a low-cost nitrogen product with a high nitrogen content. It is now being produced in satisfactory form for fertilizer and is excellent for crop production. Moreover, it is not produced for fertilizer at private plants.

WAR'S IMPACT ON RURAL LIFE

World War II has reached into virtually every home and community in the Nation, and its impact upon rural life has been general. The effects vary, however, with the distance of rural communities from larger cities, with the nature and significance of local industrial production, with types of farming, with the development of military establishments and reservations, and with the proximity of rural communities to important defense zones.

Production of food and industrial products under wartime conditions has encouraged many rural families to cooperate to a greater extent with their neighbors as a way of easing various wartime production problems, particularly those related to transportation, manpower, and equipment.

War workers commute from rural sections to nearby cities and share the use of their automobiles. Rural people make fewer trips to larger centers for purchasing, marketing, and other services, and when they do go they take along friends and neighbors. Considerable sharing of transportation takes place within rural communities for church attendance, farm meetings, and other local affairs and places.

Studies show that more farmers work together in haying, care of truck crops, harvesting, and other farm work than before the war. Sharing work seems to be more common among small- and medium-scale farmers than among large-scale operators. It depends greatly on nationality, friendship, family ties, and age of farm peoples.

Farmers are also sharing machinery and equipment. Many farmers, however, prefer to patch up their machines or to hire machine work done, rather than to borrow equipment. There is also more hesitancy in lending machinery than in sharing work and incidental transportation. On the other hand, exchange of work frequently includes exchange of machinery and tools.

Travel restrictions and extra work imposed by wartime conditions have reduced movements of farm people outside their home communities. Observations indicate that probably 60 percent of the country families do more trading in nearby local hamlets and villages than before the war. They also drive less frequently to cities for such things as movies and dances, and restrict themselves to shorter trips. They visit friends and relatives in other communities less frequently. Special efforts to improve local recreation opportunities and other social activities have been made by some rural communities. Community affairs have been revived here and there; youth centers, local dances, and other activities have sprung up. The extension services and other agencies have placed more of their meetings on a local rather than a county basis and have made greater use of local leaders.

Participation in Organized Activities

Participation in farm organizations, in church activities, and in local societies declined after Pearl Harbor, but in the past year it has revived somewhat. Farm families do not feel as urgent a need to conserve gas and tires as they did a year ago. Absence of young people affects all rural communities; some youth organizations have been dropped or greatly altered. From some sections there has been considerable migration to war plants; organization activities in these have been dropped or altered.

Organization meetings have been reduced as much as 25 to 50 percent in some sections. Organization activities that require food, travel, and the special efforts of local or outside people have been curtailed. On the other hand, most local organizations have added wartime activities to their programs, such as participation in Red Cross financial drives, preparation of surgical dressings, provision of Christmas boxes for local service men and women, and salvage collection.

Church attendance has held up. In many localities treasuries of local churches and other organizations have received increased

funds, especially where loss of people by migration has not been great. School attendance in rural sections, however, has not maintained prewar levels except in communities near war industrial centers. Many schools have found it necessary to alter their activities, particularly their interschool athletic schedules. A wartime turn has been given to high-school courses. The war has greatly reduced the supply of teachers.

Little disruption of community life has occurred. Most rural communities are carrying on as they did before the war. They have new interests and activities, new subjects to talk about, and new ties between families; but these have not supplanted old interests, activities, and ties. Common interests are greater than before the war. The impact of the war has tended to unify and coordinate the efforts and actions of communities and of organizations and institutions within communities.

DISPOSAL OF MILITARY LANDS

In World War II approximately 21,000,000 acres of land was obtained by the War and Navy Departments for use in training 11,000,000 men for combat duties and other military activities. Of this total about 14,000,000 acres was already in permanent Federal ownership in national forests, grazing districts, unreserved public domain, or other public use. With but few exceptions, these lands were made available temporarily for military, including naval, uses for so long only as the military necessity exists, to be returned to their former uses and jurisdictions when no longer needed for war purposes.

About 7,000,000 acres, much of it formerly in farms and ranches, was acquired from private owners. About 1,000,000 acres of this has been partially or completely modified by the construction of military establishments. Other areas are now occupied by industrial war plants. On the basis of preliminary classification, about 3,000,000 acres appears to be suitable for farm and ranch purposes.

The development and execution of a sound disposal program for such of these lands as are not necessary for permanent military purposes constitutes a problem of real importance to agriculture as well as to the Nation as a whole. At the close of World War I the sale of large blocks of land by the sealed-bid method, after short periods of advertising, limited the number of bidders and often resulted in prices to the Government that were but a fraction of the real value. Speculators made unreasonable profits, and, in some cases, the land was sold in farm units too small to provide a satisfactory living for a family.

Following extensive hearings, at which representatives of the Department of Agriculture were among the witnesses asked to present recommendations, the Congress enacted the Surplus Property Act of 1944, which was approved by the President on October 3, 1944. The act lays down policies and procedures in considerable detail for the disposal of all types of surplus property—food, equipment, and materials and supplies, as well as the various kinds of real estate, including war plants. Surplus property, including real estate declared excess to the needs of the owning agency, will be disposed of as prescribed by the act

under the supervision and direction of, and pursuant to regulations prescribed by, a board of three persons appointed by the President by and with the advice and consent of the Senate.

The board is directed to classify all surplus real estate according to its suitability for various uses. Generally speaking, Federal agencies would have first opportunity, and State and local governments and tax-supported or nonprofit institutions (such as schools and hospitals) would have second preference in obtaining surplus real estate needed by them for their purposes. Transfer to Federal agencies is to be at fair value. Third preference is given to former owners and their heirs, who are entitled to the return of their properties at the price paid them by the Government, adjusted to reflect any increase or decrease in value resulting from action by the Government, or at market value at time of return, whichever is lower. Where former owners or their heirs do not exercise their preference rights, tenants on these lands at time of Government acquisition are entitled to acquire them on the same price basis as former owners. Former owners whose former holdings are either not available for return or who do not wish to exercise their preference right in cases where their former holdings have been classified by the board as suitable for a purpose different from its use when acquired by the Government may under certain conditions be offered other surplus property in the same area.

Surplus real estate remaining after satisfaction of the above preferences, if classified by the board as suitable for agricultural, residential, or small-business purposes, is next to be offered to veterans or their heirs at prices fixed by the board after taking into consideration current market value, the character of the property, and its estimated earning capacity. Award is to be by lot, should more than one veteran apply for the same unit.

Any agricultural lands remaining after satisfaction of the various specified preferences shall then be disposed of to others, but so far as possible only to persons who expect to cultivate the land and operate it for a livelihood. The Department of Agriculture is authorized and directed, within the limits of its current functions under the Bankhead-Jones Farm Tenant Act, to extend needed financial and other assistance to persons eligible for such assistance under that act.

Undoubtedly the board as it gains experience under the act will, as the President indicated when he signed the measure, find amendments desirable. The entire disposal problem is complex and difficult. The Department of Agriculture stands ready to cooperate to the fullest with the board in its important task.

OWNERSHIP OF FAMILY FARMS

Numerous reports to the Department from farm people indicate that one serious post-war problem will have to do with the ownership of family farms. These reports agree almost unanimously that the vast majority of farms should be large enough to produce efficiently, yet small enough so the farm family may do the work without hiring much outside help. Such family farms should furnish a sufficient income for a decent level of living and for soil conservation and main-

tenance of buildings. Effort will be needed to strengthen the position of the family farm if a larger proportion of our farm people are to attain and hold ownership of the land they till.

Factors that may hinder the attainment of farm-home ownership after the war are: (1) Inflated land values and widespread use of unsound mortgages and burdensome purchase contracts, (2) poor landlord-tenant relations, along with excessive rental rates, (3) rapid increase in the purchase of farms by city investors, and (4) increase in the number of farmers on submarginal land.

Many farms have been purchased already at inflated values under short-term mortgages. Others will probably be purchased under still worse conditions, as returning veterans and demobilized war workers return to agriculture. Ownership attained under such conditions is unstable and insecure. Purchasers may find they haven't a chance in the fight against foreclosure. That happened after World War I, and history may repeat itself. New and powerful forces should be mobilized to prevent a recurrence of the calamity.

Farmers urge utilization of improved credit to make it possible for more of them to attain home ownership. They favor the use of special tenant-purchase credit to assist qualified farmers who without such help would remain unduly long on the lower rungs of the agricultural ladder. Loans should be made, however, only on earning-capacity values and should often be accompanied with guidance and technical assistance.

Short-term mortgages and burdensome purchase contracts, such as have often been used recently to acquire farm-home ownership, do not meet acceptable credit standards. In many instances the terms will give rise to difficulties when the war is over. Farm-home ownership can be increased and stabilized if buyers make their purchases only on earning-capacity values and if they obtain low interest-rate mortgages for amortization over a period of years, with provision for increasing the repayment schedule when prices are good and decreasing the schedule when prices are low. As yet, however, these principles are by no means in general use. Wider observance of them would be important insurance against post-war land trouble.

Demand for Farms to Rent

Competition among tenants for farms, if a landward movement should develop after the war, could retard the climb to ownership of farms by farmers and could render an already unstable tenantry still more insecure. Ways should be sought to prevent such competition from becoming excessive. Means to restore war-depleted improvements and facilities will not exist on many tenant farms, and a rush for leases would boost rentals and still further reduce the chance for tenants to earn a decent living. High rental rates have been established during the war in many areas. Such rates, along with additional competition for farms after the war, could make the post-war going hard for tenant farmers. Awareness of the danger can be a partial protection against it.

Farm landlords as well as tenants are becoming more conscious of the necessity for improving leasing agreements, through clear, concise, and complete farm-lease contracts. Lease forms prepared by this Department, with accompanying instructions and information, are being revised so as to fit them more nearly to the expected post-war situation and the problems of veterans and others who may want to rent farms.

More should be done to increase the security with which tenant farmers hold their land. The Department recommends automatic continuation of leases in the absence of adequate notice of termination, long-term commitments where livestock are produced, and compensation when leases are terminated without good cause. Replacement of war-depleted improvements on tenant farms could be encouraged through compensation agreements between landlords and tenants. Efforts should be made to keep farm rental rates more nearly in line with farm production capacity, through facilities for supplying landlords and tenants with accurate data on equitable rental rates and through arrangements for flexible cash rent payments that will vary according to price and production conditions.

Farm Buying by City People

The purchase of farms by city investors has increased rapidly of late. This has the effect of a double-edged sword against farm-home ownership. One blade hews down the number of farms available to operating farmers; the other cuts at progress made recently in developing concepts of normal values and conservative mortgages. Many farmers are becoming alarmed about this competition from city investors, whose surplus earnings have increased and who think of a farm as possible refuge from future economic storms. Many of the city buyers do not know farming; they have to rent out the places they have purchased, and the rental arrangements are frequently unsatisfactory. Ways must be found to relieve the tension that such conflict of interest creates.

Farm people are becoming more aware of the bad effect on the rural population of uneconomic-sized farms, whether owner-operated or tenant-operated. Families on substandard units can never (from the production of such places) accumulate enough savings to acquire ownership of adequate family farms. Even during boom times they cannot maintain an acceptable level of living and provide for health, education, and sanitation, though in trying to do so they may seriously exploit their material and human resources. Farmers in areas where such uneconomic farms exist want a program to consolidate submarginal units, and to prevent the further uneconomic subdivision of land. Such a program would mean fewer farmers in many areas. But those that remained would have a better chance. Safeguards against further subdividing of land into farms that are too small to furnish a living are in fact an essential means of strengthening the family farm principle.

FARMING OPPORTUNITIES AFTER THE WAR

Many industrial workers, servicemen, and veterans have indicated they are planning to enter farming after the war. Some of these men believe there will be a post-war industrial slump and already have been buying land for the purpose of obtaining what they hope will provide at least a minimum amount of economic security. Many of these purchasers, however, do not have farm experience and have purchased land that is poor for farming. In addition farmers have been buying land either to expand their operations or to provide farms for their sons now in the armed services or in war industries.

The demand for farms after the war will be influenced by the level of industrial employment. Some indication of the prospect can be had by noting the number of persons that have left farms for the armed services and war industry. Since 1940 about 1,500,000 farm men have gone into the armed forces. Several million farm men have entered war industry and other nonfarm work. The demand for farms will be partly determined by the behavior of the persons who in the war years have left the farms. If high employment continues, relatively few of them will return to the land. If a depression develops, many will go back.

Also, indications are that many industrial workers are considering investing their wartime savings in a small plot of land—4 or 5 acres perhaps—with the idea of making a living on it. This plan seems feasible for those with nonfarm incomes, such as factory workers, pensioned war veterans, and others classified more or less as rural residents. But for persons who plan to rely upon the returns of small, uneconomic-sized acreages as their sole means of livelihood, either on a permanent basis or during possible long periods of unemployment, the proposition is fraught with danger. To succeed at farming on a small tract of land usually requires experience in the specific kind of agriculture to be undertaken, as well as additional outside income. Therefore, it is extremely important that all persons who plan to buy part-time farms meet these minimum requirements: (1) Have some first-hand farming experience and make sure that they have a genuine liking for farming and rural life, (2) buy a big enough acreage of productive land for the type of farming planned, and (3) avoid paying inflationary prices for the land.

Many former farm men who are now in service or in war industry may be able to take over their home farms. Others can get employment on their home farms. If farming remains profitable and older farmers retire at the rate usual in profitable periods a considerable number of farms will become available for sale or rent to new operators. Estimates vary as to the possible number of retirements of elderly farmers which may be expected at the close of the war. Possibly 100,000 operators of full-time farms with incomes of $600 or above will want to retire. If we consider farms of all sizes and types and include those operated by tenants, we get estimates above and below 300,000 as the number of farms likely to be vacated by retiring farmers.

Some Additional Acreage Available

Additional acreage on many farms that are now too small for profitable family operation could be brought into production by clearing and drainage. Such work would often provide farms of a more satisfactory size. Other farms that seem too small for family operation might be made adequate by adoption of good farm practices such as liming, fertilizing, and seeding of pastures. Improvements of this type, however, would be chiefly replacement and maintenance of land in existing farms and would not increase greatly the number of farms or agricultural jobs.

Some new farm land could be devolped. This operation, however, requires considerable time and money. Hence it cannot provide extensive farm opportunities immediately. Irrigation, drainage, and clearing, and the return of some military lands to their pre-war agricultural use are possible sources of new farms. In many instances, however, such developments depend upon legal authorization and funds for equipment, materials, and labor. Basic to sound new land development is the existence of a demand for new land and for its products. Generally, new land to be developed should compare favorably with that already in production.

About 125,000 to 150,000 new farms could be provided by completing land-development projects under way, authorized, or in the planning stage. Major public improvements necessary for land development have been partially constructed in several areas, including the Columbia River Basin, the Central Valley of California, some other Western State areas, and the lower Mississippi Valley. Very few additional large areas of undeveloped land could be made suitable for farming, but small areas interspersed in other land in different parts of the country might be reclaimed. Much time, study, and work would be required to make such land ready for cultivation.

Relation of Farm to Industrial Expansion

As shown elsewhere in this report, the employment of farmers and other farm workers cannot be viewed separately from industrial employment. Full and profitable industrial employment, accompanied by complementary foreign trade, is the necessary basis of adequate and profitable farm employment. Hence the job of redirecting farm land use and of employing farm people requires careful integrated planning. It is necessary to have estimates of farm-production requirements, of farm requirements, of the number of farm workers needed, and of the needs of farm families. It is impossible to guess at the number of veterans and others who may expect to find full-time paying work on farms.

The major problems will be:

1. To achieve an agriculture that will produce plentiful supplies of agricultural products and at the same time provide for those engaged in farming standards of living comparable with those provided by other occupations that require comparable skills. There is a limit to the number of people that can profitably be employed in farming. It varies, of course, with the demand for agricultural products. More-

over, the number of farms and workers engaged in agriculture should have a relationship to the ability of agriculture to produce sufficient quantities of food and fiber efficiently.

2. To guide qualified individuals to good farms where they will be most likely to make a living, and to guide unqualified individuals away from farming.

3. To prevent land values from going too high. It is necessary to prevent speculation in land because the results are bad for almost all who participate in the market, particularly for the buyers, borrowers, and lenders. This is so, because land values during booms go higher than the land is worth. When normal demand for farm products returns, land values fall sharply. Accompanying this deflation in land values is a widespread loss of ownership of farms purchased at inflated prices. Also, with inflated land prices, soldiers and other young people entering farming will have to pay too much for their land.

4. To develop enough new land, where it is economically and socially feasible and desirable to do so for the purpose of providing farms (*a*) for those now farming on land which is too poor to support them, and (*b*) for new qualified operators. Included within the problem of obtaining desirable development of new land are two other problems. One is to obtain for farmers some of the benefits that result from public land development projects, the other is to obtain the retirement of submarginal farm lands for forest and other conservation uses.

Principles to Guide in Farm Selection

Well-known principles should be followed in any program intended to guide veterans and others to good farms. They involve the use of different techniques, mechanisms, and controls on different lands, and different programs should be developed for different situations. Detailed information about particular areas is necessary to develop these policies and programs satisfactorily.

More information should be obtained, for example, about opportunities on farms in established agricultural areas. It should include facts about: (1) The extent of retirement of older farmers, (2) farms that could be made to support more families through better and more intensive use of the land, and (3) single farms which could be more efficiently operated as two farms. Not enough facts are availale about undeveloped lands which can be reclaimed. Such new land needs to be mapped as to soil, topography, cover, drainage, water supply, and cost of development. It is important to know the probable human and monetary costs of reclaiming undeveloped areas, set against the probable returns and benefits. Equally important to have on hand is knowledge that will discourage or prevent the settlement of areas not suited to farming.

Information for Servicemen and Others

The Department has answered many letters from servicemen and others who want to farm. It has also issued pamphlets to aid them in making decisions. These pamphlets include Shall I Be a Farmer?;

Suggestions to Prospective Farmers in Wartime; About That Farm You're Going to Buy; The Farm Real Estate Situation, 1942–43; Wise Use of Credit; and Guiding Principles for Establishing Veterans on Farms. Also the Department has prepared self-teaching textbooks on farming for the United States Armed Forces Institute. These materials, together with Farmers' Bulletins and other standard materials of the Department and the State Agricultural Colleges, provide information on the general business outlook for farming, farm opportunities, and farm management and operation.

Recently a Nation-wide county committee advisory service to veterans and others began operations. County agricultural advisory committees or groups under the leadership of the county agricultural agent were organized to render advisory and educational assistance to veterans and others interested in establishing themselves on farms. This assistance includes advice on such matters as the types of farming suitable to particular areas, capital required for various types of farming, safe margins of indebtedness, desirable sizes of farms, partnership agreements and leasing arrangements, and sound operating practices. The membership of these committees consists of farm people, of other citizens who know local agricultural conditions, and of employees of public agencies who can help in this guidance effort.

Other measures to aid in adjusting agriculture to peacetime needs and in assisting people who want to return to farming, are under consideration. They include loans for the purchase of farms and equipment, for making necessary farm improvements, and for developing new farm lands.

Wartime Cityward Movement

As mentioned, the number of persons who return to farms from the military forces and from war industries will depend on the economic oportunities offered by agriculture in comparison with the economic opportunities offered outside agriculture. The only time since the end of our frontier period when the Nation had a net population movement from towns and cities to farms was in the depths of the depression. Agriculture then became the "poorhouse" for the temporarily unemployed. In all other periods net population movement has been away from farms. Unless we have a Nation-wide depression following the war, there should be no heavy rush to the land. Undue stimulation of such a movement would be an invitation to agricultural maladjustment and rural misery.

During the past 4 years, there has occurred the largest movement of people from American farms ever recorded in so short a period. Not all of the civilian migration can be attributed to the influence of wartime industrial activity. If migration from farms had continued at the same rate as during the last 5 pre-war years, nearly 2,000,000 persons would have left the farms in the normal course of events during the 4-year war period. We may therefore assume that the excess net migration from farms during the last 4 years roughly has been 4,000,000. Population movements into agriculture after the war will largely depend on the behavior of the extra 4,000,000 people who have left the land during the war period.

The record-breaking agricultural production of 1943 was achieved with a smaller average number of persons working on farms than in any other year of the 35-year period for which farm employment estimates are available. Estimates by the Bureau of Agricultural Economics indicate there were 322,000 fewer agricultural workers in 1943 than in 1940, and fewer in 1944 than in 1943. Agriculture can accomplish giant production even with the present reduced farm-labor force. Because output per agricultural worker has increased markedly since 1910–14, some 14 percent fewer farm workers produced 44 percent more food and fiber annually in 1940–43 than were produced in the 1910–14 period.

Agricultural production per worker for the country as a whole averaged 25 percent greater in 1940–43 than in 1935–39 and 67 percent greater than in 1910–14. Underlying these gains was progress in farm technology, mechanization, improved varieties and strains of crops and livestock, more effective control of plant and animal disease and pests, improved cultural and farm-management practices, and fuller (wartime) utilization of the working force.

Possible Post-War Trends

Many persons now working on farms are expected to drop out of the labor force following the war. On the other hand, many farmers will desire to hire extra help. Normally, a considerable number of farmers retire each year; many, however, have postponed their retirement, and immediately following the war the number of farm vacancies may increase.

If no greater proportion of the farm population of working ages remains in the farm labor force after the war than was in it in 1940, there will be about 700,000 fewer women, youths, and old people working on farms then than there are now. An additional 100,000 to 200,000 nonfarm residents who are only "pinch-hitting" for regular farm workers may be expected to give up their farm work after the war. Probably more than 100,000 adult workers can be used to replace a much larger number of children who are now helping out. These possible withdrawals may create replacement opportunities in agriculture at the end of the war for approximately 1,000,000 workers.

Retirements postponed during the depression years and during the war may involve about 220,000 farm operators by the end of the war. Approximately this number may be expected to turn their farms over to younger men. These vacancies, however, will not create the volume of agricultural opportunity which might be assumed, because nearly one-half of the retirements will probably be from farms which in 1939 had a total value of production of less than $600. Only about 110,000 bona fide farm opportunities can be expected to develop from this source.

Limitations of Land-Settlement Opportunity

If the national economy is operating at a high enough level to warrant it, approximately 40,000,000 acres of undeveloped land largely not now in farms but suitable for development through clearing,

drainage, and irrigation might create from 250,000 to 300,000 new family farm units. These lands, however, could be brought under cultivation only slowly and at considerable expense. About 4,000,000 acres are within existing drainage enterprises in Eastern and Mississippi Valley States. An additional 13,000,000 acres are outside drainage districts. Another fairly large class of undeveloped land is 5,000,000 to 10,000,000 acres of woodland suitable for development by clearing. A total of about 8,000,000 acres are now in irrigation projects which are partly developed but authorized for development or in the stages of advanced planning. An additional 10,000,000 acres could be irrigated if all physically feasible projects were developed. Nevertheless, new opportunities for land settlement are quite limited. Although the Department favors reclamation of new land as needed, national economic policy should prevent agriculture from becoming the dumping ground for the industrial unemployed. The volume of migration which agriculture can readily absorb following the war, even under favorable economic conditions, will be approximately equal to the number of those who will withdraw, after the war, from the present agricultural working force. If there is full industrial employment, few of those now employed in industry will choose to return to farms. Under any other conditions than extreme economic depression, there will continue to be many boys and girls born and reared on farms who, as in the past, will move cityward. This is a normal trend. If we have a depression, the movement of population from farms will slow down, and there may be a back-to-the-land movement. Under such conditions any stimulation of civilians to move from industrial centers to farms will encourage an unnatural trend and will invite agricultural maladjustment and agricultural underemployment.

LAND SETTLEMENT—A LOOK BACK AND A LOOK AHEAD

In colonial times, and for a long time afterwards, the people of this country by and large did not take up land in the usual manner of pioneers. They moved not from good to worse soils but from poor to fair soils, then to good soils, and finally to excellent soils. They began with the relatively infertile Atlantic coast. Next they tackled the forest lands, though it took a lifetime for a settler to clear 80 or 100 acres. It required 200 years for the pioneers to reach the easily tilled and fertile prairies. This procedure seemed to go against the rules. Authorities had believed people would naturally take up the best land first, and history showed they usually did. But what is the best land? It depends on many things. Our early settlers found themselves better suited at first with poor land near to markets and the sea than they would have been with more fertile land farther west.

Settlers took up lands in the proper order, as nearly as they could judge it; they began, in other words, with the lands that would yield them the highest return. Fertility is one of the things that the settler must consider. Other important needs are a good situation, transportation facilities, access to water and fuel, and access to markets. Our poorer lands, for almost two full centuries, were richer in these

things than our more fertile lands. Our early settlers acted wisely when they occupied the less fertile lands first. Before they could break the prairies, they had to have canals and railways, improved farm implements, markets for their products, and relief from Indian warfare. Land in the East was valuable though often not very fertile and could be sold and rented while richer western land lay untouched. Temporarily, everything considered, the poorer land was the more productive land, at least of income. It was usable immediately.

Growth of Farm Specialization

During the early days of our history, when agriculture was just a fringe along the coast, every farm was also a factory. Farming itself was only a part-time job; it had to be dovetailed with spinning, weaving, blacksmithing, building, and cabinetmaking. Farm families worked up their products into things for their own use, into eatables, clothing, furniture, tools, and harness. Production for the market was just a minor side line. Almost everything the farm produced had to be processed, through complex and varied handicrafts, on the farm itself. Also the farmers had to clear land, build roads and bridges, cooperate in barn raisings and other mutual services, take part in local government, and be ready for military action. Actual farming was only a small part of their work, and it was mainly of the subsistence kind. Farmers were even too busy to push settlement very fast.

When the surge to the West developed, and rose high in the 1830's and 1840's, the old self-sufficiency declined. In due time came reliance on factory-produced machinery, commercial farming, crop specialization, and production mainly for the market. Development of the factory system and the growth of cities gave farmers new tools and also new markets.

Factories provided the cotton gin, the iron plow, the cultivator, the seed drill, and finally reapers and threshers. Steamships started to ply the Atlantic and railroads to penetrate the West. Europe, with its growing industrial population, provided a foreign market, which vied in importance with the fast-growing domestic market. The farmer saw that he had better stick mainly to farming and let others provide equipment, supplies, processing, and transportation.

Increased Use of Science

Moreover, the farmer began to lean on science. Previously science had not meant much to him. He had welcomed useful plants and animals introduced by scientists and had listened respectfully to lecturers; but he had felt no great need for high yields per acre or large meat and milk production in proportion to the feed consumed. As for the soil, he did not usually protect it. Plenty lay around unused, and worn-out fields could be exchanged for new. But the machine age joined field to field and increased the dangers from agricultural pests and diseases. Soils deteriorated faster, plant and animal breeding began to pay, and production for sale emphasized quality.

It was especially important that shipments for export should be up to standard, since the export trade was highly competitive.

Gradually, the farmer began to rely on the scientist for aid in selecting and adapting imported agricultural plants, in fighting agricultural pests and diseases, in adding plant nutrients to the soil, in combating erosion, in suiting local farming to special conditions of soil, topography, and climate, in preparing crops for the market, and even in preventing market manipulations. Science as well as manpower moved westward and took part in the settlement of the land.

Gradual Decline of Settlement Opportunity

As in the earlier time, settlers continued to seek lands that could offer all-round advantages. Among these, however, fertility now became first in importance, since what could be produced could usually be shipped. By the time settlement reached the prairies, the country's population had increased to 20,000,000. During the developing of the grasslands, which brought 700,000 square miles into cultivation in less than half a century, the population increased to more than 100,000,000. Good land became relatively scarcer, and settlers picked the most fertile land first, until finally all the best land had been taken up.

Yet settlement continued after the turn of the century, though under less favorable conditions. Between 1900 and 1920 improved land increased by nearly 100,000,000 acres. Settlers could still get land and take root. Physical factors influenced the process in some parts of the country. In the South poor drainage and malaria delayed the advance in some areas. In the Great Plains, drought taught bitter lessons. By 1920 settlement was pushing into dry, hilly, or otherwise unsuitable land under the remorseless pressure of land hunger and population growth, with the result that eventually much land not suited to agriculture was in farms.

Harmful Legacy From Pioneer Epoch

Our pioneer epoch left us a legacy of bad methods of land settlement. The Government had thrown open the country with the idea that individual initiative in taking and using land would be good for both the individual and the Nation. This did not wholly work out. It was good to a considerable extent, but in some ways it was bad. True, the policy stimulated farming; moreover, it established owner operation widely, in line with the desire of Congress to fill the States with homes, to build up communities, and to establish an enduring civilization by giving the ownership of the soil in small tracts to the operating occupants. But it also fostered practices and conditions that injured both land and people and partly defeated the main purpose. Some of our hardest farm problems today are the direct result of ill-advised or unintelligent land settlement in years gone by.

Notably our land-settlement policy fostered exploitation of resources and of settlers. Growth of population and of land hunger promoted soil mining and provided a harvest for land speculators. Frequently, land prices soared above true land values based on earning power over

a period of years. Land charges exceeded what the land could earn, and many settlers achieved only loss. In despair, they resorted to forest devastation, overcropping of the soil, and overgrazing of the range.

The Nation had given away some 270 million acres in homesteads. After selling or granting millions of acres more to individuals, railroads, and States, it woke up to the fact that vast areas of farm, pasture, and forest land had been devastated, that farming had extended into regions not suited to farming, that farm families throughout large portions of the country had failed to achieve a comfortable living, and that land ownership and operation were moving apart.

In the 1930's more than 42 percent of the Nation's farm families were tenants, and more than 900,000 farm families had gross incomes (from farming and part-time nonfarm work) of less than $400 a year. Some of these families, to be sure, had additional sources of income (such as investments and pensions); nevertheless, the average level was very low. Much formerly productive land had been destroyed by erosion and had become a national liability, frequently not worth rehabilitation—ruined forever. Farm, range, and forest areas revealed irreparable damage, as a result in large part of misguided settlement and mistaken land use practices.

Our early land policy ignored important regional differences. For example, homestead grants were too small in the semiarid areas. Also, the policy gave occupants the right to use or abuse the land as they saw fit, with the result that extensive areas of farm, range, and forest land suffered mostly abuse. These defects did not all show up at once. When land was plentiful and population sparse, the path to ownership was easy, and owner operation prevailed. With good land free or cheap, no one had to work long for another, either as laborer or tenant, if he cared to set up for himself. For the time being, it apparently paid to exploit and damage natural resources. In this phase the policy had few obvious drawbacks, and its hidden drawbacks remained hidden until the days of the open frontier were over.

As the country filled up, however, and the good free or cheap land disappeared, newcomers had to apply for land to those who had preceded them. They had to become tenants or buy farms at prices which gave the former owners most of the earnings for a long time. Eventually even these ways of getting land became difficult or hazardous, and the Nation found it had a large army of landless and poverty-stricken farm people. The national heritage was insufficient for the heirs. Land scarcity is the lot of all expanding populations, but our own change from land abundance to land scarcity was unusually rapid. Adjustment in land policy could not keep up, and the mistakes of the past presented an ever-mounting bill.

Adjusting Settlement to Needs and Opportunities

Land settlement takes place constantly, even in long-settled areas. It will continue in the United States, though on a reduced scale. Old farmers die or retire, and modern facilities, especially drainage and irrigation, make some land usable that formerly was not. Our problem now, and in the future, is to adjust settlement to the need and

the opportunity. After the war the demand for farms will probably increase, though the demand for some farm products may not. Unemployment and reduced urban buying power may develop as workers and fighters turn from war to peace. Many of these men will go to the farms—some of them to stay with relatives, others to seek jobs or subsistence, and still others to buy or rent farms. Many city folk who have made money during the war but don't feel sure they can make any more, will be potential farm owners and farm operators. The erroneous idea that the land is a good hide-out from depression may have wide circulation.

How shall such tendencies, in themselves quite natural, be influenced so they will not cause too much movement toward the land, such as took place after World War I? How can they be squared with the real opportunity? Any worth-while answer ought to be specific, and no specific answer is ready. But let us remember that the key to it will not be found exclusively in agriculture. This is increasingly an industrial country. Land settlement can be kept in a good proportion to other activities, and managed for the common good, only if the country maintains a high and well-diffused industrial activity, so that farming will be an opportunity rather than a mere flight from distress. If land settlement is to prosper, it must be only one among many opportunities open to aspiring youth, and most of the other opportunities must be industrial. As an only recourse or even if seriously overemphasized, land settlement will not work.

Proper Ratio of Farm to Nonfarm Population

Our post-war land-settlement policy must not raise the farm proportion of the total population, because agriculture would then be overmanned. Under normal conditions it is already overmanned. Though free land attracted multitudes in the nineteenth century, the proportion of the gainfully employed population engaged in agriculture declined as a result mainly of two factors: (1) Technical progress in agriculture which increased production per agricultural worker; and (2) a decline of farming opportunities relative to nonagricultural opportunities. In other words various pressures produced a larger growth of urban than of rural occupations. It should be our business to strengthen and continue the growth of nonfarm opportunity so as to prevent congestion on the land and to increase the size and purchasing power of the farmer's market. We should remember that farm technology is improving faster today than ever before and also that we don't have land enough for new multitudes in farming.

Land settlement will then remain in bounds and will work out for the good of the settler and for the good of the country. Movement of population in the United States has been townward on balance for more than a century. In the depression years, however, it turned farmward and in addition about 2 million young people remained on the farms who normally would have gone to the cities. After the present war we shall not want any repetition of that heavy abnormal growth of farm population. Such a movement would ruin hopes of healthful, well-proportioned land settlement, which under our present conditions is sound

only to the extent that the farmers' market expands. Land rushes which are mere flights from unemployment promote farm poverty rather than farm prosperity.

Possible Post-War Needs

Nevertheless, the post-war world may conceivably provide some new scope for additional land settlement in this country. The United Nations intend to improve the nutrition of their peoples and to increase their world trade. Some of the increase will be in farm products. Moreover, increased factory exports will benefit farming, since the people who produce these exports will have more money to spend. Agriculture will also have to provide relief supplies for foreign countries and to help feed countries that are moving through industrialization on to a food-deficit basis. It is possible that some tropical countries, as they raise their living standards, will increase their imports of foods and fibers from the Temperate Zones. The market for our crops could be much larger, for example, in many Latin American countries, which in exchange could send us coffee, rubber, oil crops, drug plants, fiber plants, and spices. Extensive areas in Latin America have need of more cereals and livestock products. Moreover, our farmers may regain some of their foreign markets for wheat and cotton.

Whatever improves the outlook for agriculture also improves the prospect and may increase the need for land settlement, which should proceed to the extent of the real opportunity. Mechanization opens areas that formerly could not be touched; reclamation and drainage enlarge the tillable area. Changes in the design of tractors, improvements in the combine-harvester, and work with cotton pickers may raise up to the farming level some land that is now below it. Some land devoted now to such military purposes as war plants, cantonments, and bombing ranges may again become available for agricultural uses. Deserts and swamps may be conquered.

In short we have considerable land that could be brought into cultivation. Costs should be watched, of course, and also the trend in the demand for farm products; but it would be unwise to oppose new land settlement on the mere ground that it can be harmful if overdone. The big requirement is to keep it in proportion to the need. Surveys must be made to determine just where the lands are that could carry additional population, and to indicate what dredging, draining, clearing, or irrigating may be necessary. New farms should then be started where farmers have a chance to make good and not elsewhere. Geared properly to the farm outlook, and based firmly on the principle that real opportunities should be developed, land settlement after the war can play a significant part in the total peacetime readjustment.

THE FARM-LAND BOOM

The farm-land boom now under way and gaining momentum in many areas is rapidly becoming one of American agriculture's principal problems. Strong action is necessary if it is not to be the cause of another prolonged period of agricultural insecurity and distress.

The farm-land market has reached a stage at which many farm

buyers—as well as city buyers, including professional speculators—are overemphasizing current high farm-commodity prices and high farm incomes. It is in a position in many respects similar to that which led to disaster after World War I.

Forces that may bring about a disruptive land boom stem basically from high farm incomes and surplus purchasing power. Cash income received by farmers has more than doubled in the last 5 years; in 1943 it was by far the largest on record. This summer the demand deposits in the country banks of 20 leading agricultural States were more than three times those of 1939, and were still increasing.

Present and prospective farm returns provide increased farm buying power and make the purchase of land seem attractive, not only to farmers but to others. Average rental returns during 1943 were at 10 percent, the highest average yet recorded. This was materially higher than the yields obtainable on the most readily available alternative investments, such as industrial common stocks, bonds, and mortgages.

War bond purchases, income-tax increases, and price controls have not prevented a continuous increase in the volume of the funds available for land purchase.

In consequence, farm real estate values are moving upward about as rapidly as they did during the last war. Average per acre values in the summer of 1944 were more than two-fifths above the 1935–39 average. This may be compared with the 40-percent rise that occurred from 1912–14 to 1919. In many individual States and in areas within certain States much more than a two-fifths increase has occurred in the present war period. In Kentucky and Colorado, for example, average values have increased more than 70 percent. In South Carolina, Indiana, and Tennessee the increases have averaged more than 60 percent. They have averaged more than 50 percent in 13 other States.

These value increases have been accompanied by a record volume of land sales. For the 12 months ended March 1944 the volume of sales was 53 per 1,000 farms, the highest of record. It was about one-fifth above the estimate for the previous year, and about one-tenth above the estimate for the previous high, which was reached in 1919 in the first year after the close of World War I.

Many of the purchased farms are being resold at a substantial profit after a very limited period of ownership. More than 10 percent of all current sales are resales of farms which the sellers have acquired within the last 2 years. In about 1 county in 7 such resales account for 20 percent of all sales. Three-fourths of the tracts resold have been held less than a year; over two-fifths have been held less than 6 months. Profits from these resales have usually averaged from 20 to 30 percent of the previous purchase price.

In most purchases of farms large cash payments are being made. Recorded transfers indicate that about one-half of all voluntary sales in 1943 were for cash, a slight increase over the proportion in the 2 previous years. On credit-financed sales during 1943, down payments averaged just under two-fifths of the purchase price, as compared with one-third in each of the 2 preceding years.

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Yet, heavy debts are being built up on a significant number of the farms sold. In many cases the increase in the size of down payments has not been sufficient to offset an increase in the sales price. Average mortgage debt per acre in credit-financed sales has increased almost one-fourth since 1941. More persons went into debt in 1943 to buy land than during any year since 1920, despite the frequency of cash sales. Many buyers went heavily into debt. About one-third of the purchasers in credit-financed sales borrowed 75 percent or more of the purchase price.

Unsound Features in the Land Market

In short, many features of the current land market are unsound. Moreover, unless checked, unsound, inflationary trends will be likely to continue. Study of the long-run forces that influence farm-land values indicates a high probability that a deflation in values will follow cessation of the wartime stimulation. Such deflation could have disastrous consequences.

Many who are interested in the future of American agriculture are apprehensive. They recommend measures to curb further undesirable developments in the land market. The problem is many-sided and calls for action along several lines. Strengthening of programs to curb inflation generally is important, such as a greater effort to limit price and wage increases and to absorb purchasing power through taxation, war bond purchases, and debt retirement. Conservative lending policies by financial agencies and informational and educational efforts can help to develop more cautious attitudes toward land values. The Farm Credit Administration and the Farm Security Administration, for example, adhere to normal values of farms in making farm-mortgage loans. This Department and several of the land-grant colleges are cooperating in educational programs. Such programs are helpful and could profitably be expanded. It has become clear, however, that stronger and more direct measures would be desirable.

Special Tax Measure Suggested

The Department has concluded that a special tax measure designed to discourage speculative activity in the farm-land market would be both effective and equitable. The principle would be simple. It would largely remove the incentive for speculation by applying a heavy tax on profits from the resale of farms acquired after the measure became effective. Sales by present owners would not be subject to the special tax, which would apply only to properties both purchased and again resold after a limited period of ownership. The resale-gains tax would not be a permanent measure. It would be in effect only on purchases during the war emergency period.

Expected chief results would be:

1. It would virtually eliminate the speculative motive in purchasing farms and yet not interfere significantly with buying for long-term operation or investment.
2. It would stabilize farm-land values by reducing both the number of buyers and the level of bid prices, and in that way would discourage a "land boom" psychology.

3. It would take for the public treasury a large part of the windfall gains from farm-land-value increases that accrue because of war conditions.
4. It would encourage stability of ownership and discourage frequent sales at spiraling prices.
5. It would avoid working a hardship on present owners and would avoid restricting the market supply of farms from this source. This would be accomplished by the exclusion of first sales from the application of the tax.

Possible Regulations of Land Credit

Purchases for operation and investment, however, might push values above warranted levels, even if the speculative motive were practically eliminated. Under such conditions a second major type of control might be needed; namely, regulation of the extension of credit secured by farm land. Credit controls could prevent or minimize the extensive loss of equities in a possible post-war deflation period, since they would require adherence to conservative loan policies now. Such controls would curb excessive value increases in several ways and would also discourage speculation.

One way to limit secured credit on farm real estate would involve the establishment of debt ceilings or limits for individual farms. If this principle were adopted, the limit on a particular farm or tract would become the maximum amount of debt that could legally exist against it for the duration. It would be possible to impose such a limit to credit extensions on all farms, or alternatively, the limit could apply only to farms that are sold. The more comprehensive approach would have the advantage of preventing excessive mortgage debts from being built up on any farm. Restricted to farms sold, the debt limitation would not insure against the danger of heavy debts being placed against nontransferred farms. It would be somewhat simpler to administer, however, and would keep credit within bounds on the farms most liable to become excessively indebted.

Credit limits could be established either: (1) On the basis of the existing loan, or (2) on a percentage of an approved appraisal. The appraisal would be made by Government-accredited appraisers, and it would be based on normal values, as of a stated preinflation date. Such debt limits, once established, would hold for the war emergency.

It would be desirable to adjust the impacts of such a regulation on land purchases by tenants. This could be done by establishing a somewhat higher debt ceiling on land bought for owner operation than on land purchased exclusively for investment. The debt-limit type of credit control is sufficiently flexible for this purpose. In other words, it can allow for most debt increases that appear to be essential; yet it can operate as a safeguard against the growth of excessive farm debts.

Expected Results From Debt-Ceiling Measure

Expected chief results from a debt-ceiling measure would be:

1. It would insure against widespread loss of farms by foreclosure in post-war years.
2. It would set up, on the basis of normal or preinflation-value appraisals, guides to long-run reasonable farm values, and this would provide a bench mark or standing warning against paying inflated prices.

3. It would favor the purchase of land by farmers who will operate it and, at the same time, keep mortgage debt within reasonable limits.
4. It would curb unwarranted land-value increases by eliminating much "shoestring," speculative, and other demand for land based on borrowing.
5. It would prevent the use of mortgage credit from contributing to a general inflationary spiral.

Probably, the degree of control available under the proposed resale-gains tax and the proposed debt-ceiling measure would be enough for stabilization of the farm-land market. The resale-gains tax would check speculation, while the debt-ceiling measure would insure moderation in the extension of mortgage credit. Both would have a curbing effect on sales activity and on land-value increases.

Even so, one principal source of farm-land-value inflation would remain; namely, widespread purchases by "cash investors." Serious land value inflation could come from this source. It might be prevented by a high-rate transfer tax. If additional measures were needed, practically complete control of the land market could be effected under a price-ceiling and purchase-permit system. The immediate need for either the transfer tax or the complete control approach, aside altogether from their acceptability, is open to question. Perhaps only a very drastic threatened change in the farm-ownership pattern, such as general inflation brought about by an urban rush to buy land, could justify the application of such control measures.

Curbs on Speculation Imperatively Needed

The aftermath of an unrestricted land boom can be extremely serious. The impacts include widespread loss of ownership of mortgaged farms, a lowering of farm living levels in attempts to hold debt-burdened farms, a less desirable pattern of farm tenure, social friction and bitterness incident to foreclosure and dispossession, impaired confidence in financial institutions, accelerated rate of soil depletion, failure to maintain farm improvements, and greater difficulty in making farm adjustments to post-war conditions. It is therefore highly important to slow down debt and value increases. Necessary measures should be regarded as on a parity with other national means of heading off inflation.

HIRED LABOR IN AGRICULTURE

The farm-labor problem has not had much attention from the community at large. In the last 2 years there has been, of course, general public awareness of one of its aspects—how to get sufficient help on farms to produce the wartime food and fiber supply. But the problem has other and deeper phases which are destined to make it a matter of increasing public concern after the war ends.

It involves the earnings and living standards of several million unorganized and inarticulate people who live partly within agriculture and partly on its fringes and who shift in large numbers between farm jobs and nonfarm jobs. All evidence points to the fact that they are among the most disadvantaged people in our society. Farm labor-

ers constitute probably the poorest paid large group of essential workers in the United States. They include the workers who are most frequently out of work, families that are frequently without decent or even fixed abodes, and children so poorly schooled as to be almost a social liability. Their plight often gives rise to problems of public health and creates other dislocations in community life.

The tradional hope and incentive of the hired man, the hope of accumulating capital and climbing the ladder through tenancy to farm ownership, has been impaired under the intensive development of our commercial economy. Modern farming operations require so large an investment in machinery, land, and buildings that only a small percent of farm laborers are able to become established on economic units of their own. Moreover, the factors which have restricted the hired man's chances of becoming a farmer in his own right have resulted in the displacement of many small farmers. These displaced farmers remained for the most part in agriculture, but as laborers. They were competing, in the years prior to World War II, with others in the hired-labor force for a diminishing number of farm jobs.

In short, farm laborers are a group which, although long a familiar part of the American agricultural scene, does not fit into our latter-day social pattern as well as it did a generation ago and whose case might conceivably become as grave a source of unrest as it has in certain other countries.

It is true that wartime demands for their services have enabled farm laborers to improve their position temporarily. Their income has been stepped up. They have better food, better clothing, somewhat better housing, and more stable jobs than they had before the war. Preservation of these gains in post-war years will require much constructive action.

The number of individuals who work on farms for wages in the course of a year exceeds the hired-farm-laborer figure of even a peak month.

It is estimated that about 4,000,000 people work for wages on American farms during at least some part of the year. With their families, they comprise a group of perhaps 6,000,000 to 8,000,000 persons who are partially or wholly dependent on farm wages for their income. A majority of the laborers are to be found on a small proportion of the Nation's farms, though these are the farms that produce the bulk of the country's food and fiber. Hired workers constitute about one-fourth of the farm working force, but because they are so heavily concentrated on the larger or more productive farms they make possible much more than one-fourth of the total agricultural production.

People recorded in our statistics as hired farm laborers include a mixture of low-income farmers, members of farmers' families, people who work part time in towns and cities, youths who attend school in the winter, migratory workers who follow the crop harvests, and year-round hired men. Thus the group as a whole is quite a broad segment of our population, with economic and social interests linked at many points with those of rural and urban folk generally.

Manpower demands of the armed forces and industry, along with wartime travel restrictions, have greatly curtailed the movement of

migrant farm workers, many of whom formerly transported themselves and their families from one crop harvest to another in jalopies. As a result, it has been necessary for the Government to engage in a farm-labor recruitment and transportation program during the war. Thousands of workers have been recruited in foreign countries, and they, as well as many domestic farm laborers, have been transported at Government expense to areas of critical labor shortage.

Another result of the war-induced shortage of labor has been the rise in farm wage rates. The low wage rates which formerly it seemed impossible to raise have advanced considerably and in some areas have necessitated ceilings.

Trends in Retrospect

During the period 1910–30, farm production per worker rose 35 percent. However, wages and income of farm laborers remained at virtually the same level. Their wages including the value of housing, board, and other perquisites furnished them, averaged throughout the 1910–30 period $265 a year in terms of 1910–14 purchasing power—an amount far below the requirements for health and decency. In the depression years (1930–33) the real wages of farm laborers declined, but they regained the lost ground in the recovery period that followed, and moderately improved in the years immediately preceding our entry into World War II. The lack of any substantial gain in the real wages of farm laborers during several decades before World War II contrasted sharply with the progressive rise that took place in the same period in the average income of industrial workers. Real-wage income per industrial worker climbed from an annual average of $600 in 1913 to $739 in 1930, to $855 in 1939, and to an average during the 4 years 1940–43 of $1,060 (in terms of 1913 dollars). This happened despite the depressing effect on wages of mass unemployment in the 1930's.

During the first World War farm wages rose to unprecedented heights, but the cost of living climbed equally, so that farm laborers were no better off. So far in this war real farm wages have shown an improvement; but so have the wages of industrial workers, which, as noted, have been steadily rising since pre-World War I days. The gap, therefore, between farm and industrial real wages is even wider than before.

Average real net farm income, per farm-family worker[1] (in terms of 1910–14 dollars) fluctuated considerably in the period 1910–39. In the depression years 1921, 1931, and 1932 it declined to approximately the hired laborer's level. For the whole period 1910–39, however, real net income from farming, per farm family worker, averaged $400; while real farm wage income (including perquisites) per hired worker averaged $263. In the last 4 years (1940–43) the figures have risen to $700 for family workers and to $393 for hired workers (in terms of 1910–14 dollars).[2]

[1] Farm-family workers are operators of farms and family workers who do not receive wages.

[2] These are the averages based on net income for all farms, which understate the differentials between income per hired worker and income per family worker on farms which hire labor.

Our legislation to protect workers from the hazards of accidents does not cover farmers or farm labor. In 1943, 17,200 farm workers and members of farm households were killed and 225,000 seriously injured. This enormous loss came at a time when farm production was vital to our war effort.

While agricultural conditions present certain differences which would call for adaptations in the form and content of social legislation, these differences have been no bar to the extension of such legislation to agriculture in other advanced countries. Agricultural programs designed to improve the economic lot of United States farmers have made no explicit provision for wage workers to share in the benefits, except in the single case of the Sugar Act. This measure makes payment for fair and reasonable wages a prerequisite to the receipt of benefit payments by producers.

Hired Labor in the Economic Pattern

All available data show that the pattern of economic conditions for hired farm workers follows closely the pattern for farmers and that of farmers is in turn dependent upon the level at which the rest of the economy is functioning. Maintenance of farmers' income at satisfactory levels is a prerequisite to satisfactory farm-wage levels. It should be noted, however, that over-all figures on gross or net farm income do not correctly reflect the economic position of farmers who do the bulk of the hiring of labor.

The fact is that the major share of agricultural production and income is produced and received by only a fraction of the farms and farmers. In 1939 the upper 10 percent of the farms accounted for 54 percent of the Nation's sales of farm products. Hence the essence of the farm-labor problem cannot be seen unless we are cognizant of the difference in economic conditions between the farmers who are the principal employers of wage labor and the mass of low-income farmers. National policies with respect to post-war agriculture cannot afford to overlook the pressing problems of low-income farmers—problems which have much in common with those of hired farm workers. Moreover, the presence on the land of a great many low-income farmers has profound indirect effects on farm-wage conditions.

During the 23 years since 1920 the farm population has had an average annual rate of natural increase of approximately 430,000 persons a year (from its excess of births over deaths). In the number of persons of working age the yearly increase has been greater. Over this period labor requirements and employment opportunities in agriculture have decreased as technological and other factors have stepped up the average productivity of farm workers and as certain processing functions have shifted from agriculture to manufacturing. In consequence, maintenance of the level of living of farm people has required a continual drawing-off of excess rural population.

Farm Wage Rates Reflect Employment Generally

Naturally, any slackening off of urban employment reduces the migration from farms. Hence, in times of urban unemployment, the position of farm laborers comes under increased pressure. The record shows that farm-wage rates are highly vulnerable to recurring cycles of mass urban unemployment. Thus, contributing factors to substandard farm wages are to be found in conditions internal and external to agriculture. The importance of full urban employment to the economic welfare of farmers and farm laborers can hardly be overemphasized.

Migration from farms was fairly rapid during the 1920's, but much of the effect was offset by the high rate of natural increase in the farm population. In the 1930 decade migration from farms was completely offset by natural increase. In fact, the number of people of working age on farms increased, though the number of people actually working on farms was smaller at the end than at the beginning of the decade. Wartime has seen an unprecedented migration from farms. The present level of the farm population is approximately that which would have resulted had the 1916–40 trend not been interrupted by the depression of the 1930's.

Should the movement reverse itself after the war to such an extent as to bring the farm population back to its pre-war level, farm wages would undoubtedly fall, simply from the pressure of the surplus labor supply. Under such conditions programs for improving or maintaining income of farmers could not greatly ameliorate the condition of farm laborers. The presence on the land of excess population, with large numbers of persons forced into subsistence farming, would tend to depress farm wages.

The Nation's Responsibility

Although various measures can provide some degree of protection to agricultural wages, such measures cannot be looked upon as offering a panacea for all problems affecting the economic well-being of hired farm laborers. The challenging task for post-war agriculture is progressively to raise living standards for millions of low-income farm people—owner-operators, tenants, sharecroppers, and hired farm laborers. Policies to achieve this major objective will necessitate supplementary measures directed toward making agriculture more efficient and better able to provide an adequate level of living to farmers and farm laborers. The measures must necessarily be broad enough to deal with internal and external conditions affecting agriculture.

National agricultural policy after the war may well incorporate the principle that parity for agriculture with other industries also implies a parity of responsibility to pay and maintain adequate wages and working conditions for its wage workers. Provision of wholesome and suitable housing and facilities for medical aid are an important part of these conditions. The farmer should know that his own forward-looking steps are the best guarantees of achieving a pattern of wholesome labor relations.

For farmers as well as for hired farm workers, a major post-war objective will continue to be the extension to them of legislation for social security and unemployment compensation.

POST-WAR IMPLICATIONS OF WARTIME FARM CHANGES

Production of farm products for sale and use in the farm home in 1944 was 33 percent higher than in the pre-war years 1935–39. The most important crop increases took place in the food crops wheat, beans, and peas; and in the oil crops soybeans, peanuts, and flax seed.

The 1944 output of food from livestock was 40 percent above the 1935–39 average. This tremendous increase in livestock production was made possible partly by high yields of feed crops from 1940 to 1943, and partly by feeding wheat and imported grains. The yields of feed grains, hay, and pasture in the years 1940 to 1943 were enough above normal levels to increase livestock output about 5 percent.

Wartime increases in production by 1943 had involved an increase of 4,905,000 acres in land used for crops and an increase of 8,495,000 acres in intertilled crops. These changes in land use mean fewer acres in plowable pasture and in fallow and idle land. The large increase in the tame hay and plowable pasture which took place during the 1930's created a reserve of land fertility that could be drawn upon in wartime. We therefore have been depleting our reserves to a certain extent. We are drawing on soil resources that eventually will need to be replenished. However, there are no indications that wartime changes in farming have caused any large-scale permanent injury to soil resources.

Fortunately farmers purchased a large volume of farm machinery in the years 1937–41. Replacement of old machines, and a shifting to mechanical power in those years, made it possible for farmers to step up and to maintain a high level of wartime production despite the reduced quantity of new machinery available in 1943.

The record 1943 production was produced with 6 percent fewer workers in agriculture than in the 1935–39 pre-war period; and much more of the working force consisted of inexperienced workers, women and children, and older men. In other words, this record production was attained with a smaller and less efficient labor force than in the pre-war period, and with a serious shortage of new farm machinery, building materials, containers, some kinds of fertilizers, and other supplies. This result gives some indication of the tremendous production capacity in agriculture that could be drawn upon if need arises and if farmers are given sufficient time to mobilize resources for maximum production.

Weather during the year 1940–43 has been favorable to large crop production. Crop yields in 1942 were exceptionally high. However, recent studies of weather conditions in relation to crop yield indicate that with average weather conditions we can expect about 20 percent higher crop yields than those experienced in the 10-year period 1923–32. The reason for this change is the rapid adoption of improved farming practices such as the use of hybrid seed corn, increased use

of lime and fertilizer, winter cover crops, improved crop rotations, and contour farming. This is a remarkable change in a short period, but it appears that we are only beginning to reap the results of many of the improvements in farming practices that have come to the forefront in recent years.

March of Farm Technology

Greater use of fertilizer and lime hold more potential promise of increased crop yields than any other single measure. When materials become available after the war it would be quite possible to step up the applications of lime and fertilizer in many areas. This would result in large increases in yield per acre. It is one of the simplest ways of increasing the size of business on smaller farms in the areas where the land responds to fertilizer and lime treatment.

Use of improved varieties is one of the easiest, cheapest, and surest ways of getting higher yields. Hybrid seed has increased corn yields per acre about 20 percent in the Corn Belt. New corn hybrids adapted to areas outside the Corn Belt will add to corn yields in those areas. Higher yielding soybean varieties, and disease- and insect-resistant small grains will also make land more productive. However, increased production from higher yielding strains and varieties of crops means that greater attention must be given to maintenance of soil fertility.

Marked increases in yield can be obtained from contour tillage of sloping land both in humid areas like the Corn Belt and under the semiarid conditions of the West. Substitution of high-quality legume hay and pasture for the lower yielding grasses (along with proper lime and fertilizer treatment where needed) could increase roughage production 25 to 30 percent and in that way provide an increased feed supply for livestock. This improvement holds special promise in some of our feed-deficit areas. Livestock production therefore will be affected both by larger feed supply and by greater efficiency in the utilization of feed.

Improved methods of preventing and controlling outbreaks of plant and animal diseases and insect infestations will result in larger output per acre and per animal.

Increased use of mechanical power and associated equipment means not only more production but also a larger share of it going to market. Shifting from horses and mules to tractor power involves a shift from producing power on the farm to buying it in the market place and in turn using the land for producing commodities for sale instead of growing horse and mule feed. The shift to tractor power since 1920 has made available about 60,000,000 acres of crop and pasture land for the production of products for sale. After the war when machinery again will be freely available to farmers, we are likely to experience a rapid acceleration in the trend toward mechanical power and new and improved types of farm machinery. In former years mechanical power was best suited to the needs of the larger farms. There are indications that after the war smaller machines will be developed to sell at prices that will attract purchases by small producers.

Increased mechanization may result in making 8,000,000 to 10,000,000 more acres of cropland and pasture land available for farm products for the market in the next 5 to 6 years. Crop yields per acre are likely to increase because of greater timeliness and more thorough performance of farm operations. Labor requirements per acre or per unit of livestock production also will be greatly reduced.

Post-War Production Possibilities

Reconversion from war to peace will call for many changes in farming and the onward march of technology will accelerate the need for adjustment. Of major importance will be changes in crop rotations and conservation practices that will be needed to restore soil fertility and to maintain or improve soil resources. Farmers in most regions will need to give more emphasis to hay and pasture in their crop rotations. In the drier areas they will need to re-emphasize summer fallow and strip-cropping practices, and in both the humid and dry areas they will need to give increased attention to contour farming on sloping lands. All in all, farming systems need to be rebuilt to provide production stability over a period of years.

The job of reconversion will vary in its effects on different farm commodities and in different regions of the country. The oil crops—soybeans, peanuts, and flaxseed—again will meet the competition of fats and oils produced in other parts of the world, especially the tropical oils. What effect will this have on our greatly expanded acreage of these crops? Will they have to shrink back to their pre-war levels, or have we learned how to produce these products so efficiently that we can maintain a larger share of the world's production in this country? Although we have increased production efficiency, most of the answer to this question depends on the level of industrial activity that is maintained in this country and elsewhere, and therefore on the possible increases in market outlets for oil and its byproducts both in old and new uses.

If markets for farm products call for a large volume of production of livestock and livestock products we shall need a large quantity of oilseed meals to balance our feeding rations. Even under present conditions the market value of soybean meal from an acre of soybeans is greater than the market value of the oil. In a sense, therefore, oil is a byproduct of soybean meal in the same way that cottonseed oil is a byproduct from the production of cotton lint. In addition to oil, other food uses of the oil crops seem likely to become more important. Both peanuts and soybeans seem destined to play a larger role in American diets. A much larger acreage of peanuts than formerly also is likely to be grown for oil and meal, hog feed, or harvesting by the hogs on the ground.

When war and relief needs are at an end there is likely to be a decided slackening in demand for dry edible beans and peas for food uses. This probably will mean a considerable reduction in the dry-bean acreage. There are some indications that production of peas might be continued on a fairly large scale in the Pacific Northwest wheat areas where peas can be grown in rotation with wheat. They

may find a place as home-grown high protein livestock feed for that area.

Wheat production again has been greatly expanded to meet wartime needs—for food, for feed, and for the manufacture of industrial alcohol. Perhaps at the end of the war we will have learned to think of wheat as a feed crop as well as a food crop. We may then continue to produce some wheat for livestock feed, as well as for human food. In many areas wheat will produce more feed per acre than alternative feed crops, and at no greater expense per unit of feed.

The 1943 harvested cotton acreage was only 53 percent of the average acreage in the years 1923–32. However, the average yield per acre was 253.5 pounds of lint, as compared with an average yield of 170 pounds in the earlier period. The yield in 1943 compares with an average of 245.6 for the years 1937–41. It is apparent that the increased yield of cotton per acre in recent years has to a large extent offset the reduction in acreage and that our total output of cotton has been maintained at fairly high levels. Cotton yields have increased the most in the Mississippi Delta and in the irrigated areas of the West. Increased use of fertilizer, winter cover crops, and selection of more productive land for cotton seem to be the principal factors in the increased yield per acre. Our carry-over of cotton at the end of the war will be large. We therefore will need to consider seriously the position of American cotton production in relation to producing areas in other countries.

The large wartime increase in cattle numbers will need to be brought into line with the longer time carrying capacity of ranges and pastures and with available roughage feed supplies. Hog production will need to be balanced with current production of concentrate feeds and with market outlets. Markets will depend largely on the level of consumer purchasing power, which in turn partly depends on recovery of the export market.

Producers of poultry and eggs will need to give consideration to the post-war effects of wartime developments in egg drying and the geographic changes in egg production. It seems likely that some of the wartime expansion in egg production from farm flocks will be retained in the post-war period. Unless total consumption is greatly increased, this development means keener competition for specialized poultry and egg producers.

Milk production has not increased as much in the war period as production of other livestock products. For this reason, as well as because of the fact that milk and its products are likely to become more important in American diets, the changes required in dairy production may be less severe than in some other lines. However, new developments in the processing of whole- and skim-milk powder, and increased emphasis on evaporated milk may have important repercussions on the geography of milk production and on the utilization of milk and its products.

Regional Problems

Needed changes in farming after the war will vary considerably for different major regions of the country. These differences will have

their roots in adaptability of the land resources for production of different products, the availability of consumer markets, technological changes, and many other factors.

Farmers in the Northeastern States have the advantage of a large nearby consuming population. About one-third of the total population of this country lives in the States located north of Virginia and east of Ohio. With such a large nearby consumer market, northeastern farmers specialize in milk, eggs, vegetables, and fruit production. Farm prosperity therefore is intimately associated with the purchasing power of city consumers for the farm products grown in the region. Northeastern farmers are only indirectly dependent on the size of the export market. It affects them only as it furnishes more employment for urban workers. But new developments in processing and transportation are likely to have important effects on northeastern agriculture. Increased use of quick freezing, dehydration, and other improved practices in the production, processing, and handling of farm products in other areas will mean greater competition for fresh fruits and vegetables and even for fresh milk and eggs. Increased emphasis on home-grown feeds and continued progress in efficiency will help in meeting the competition from other areas.

The Corn Belt States contain one of the largest areas of fertile and fairly level land to be found anywhere in the world. This land is suited for production of a number of commodities that are produced for shipment outside the region. Corn, oats, and soybeans among the crops—grown with a suitable rotation of legume hay and pasture—and hogs and cattle among the livestock are likely to retain a preeminent place in Corn Belt farming; but poultry and dairy production will become relatively more important. Market demand for farm products will largely determine the intensity of production in this region, and the resulting income per farm. Mechanization is fairly complete, but changes are yet to be made in sizes and types of farms to fit the new developments in mechanical power and associated equipment.

In the Lake States the growing influence of the highly industrialized areas along the southern border of the Great Lakes—Chicago, Milwaukee, Detroit, Cleveland, and Toledo—will furnish a considerable nearby market, especially under conditions of prosperity. Also the increasing importance of milk and its products in the American diet will lend stability to the dairy enterprise and, therefore, to much of the farming in this region. Improvement of production, harvesting and utilization of hay, and pasture improvement, are of real significance to farmers in this region.

In the pre-war years the 13 Southern States supported over half of the total farm population of this country on less than one-third of the total cropland and received about one-fourth of the cash farm income. Southern farming is dominantly specialized cash-crop farming—cotton, tobacco, rice, or fruits and vegetables. Often it involves sharecropper tenancy, and much hand labor is required for many of the crops. The seasonal distribution of labor requirements, in cotton and tobacco farming especially, is such that a large amount of slack time is inevitable unless farming systems can be built up to include other crops and some livestock enterprises.

In the cotton areas the future is intimately associated with production developments and the market outlook for cotton. Increased use of mechanical power and the gradual development of the mechanical cotton picker will have a decided influence on farming in the cotton South. It seems quite likely that mechanization of cotton farming will give greater advantage to the level, more productive areas. Furthermore, the problem of soil conservation needs serious attention in the hilly areas of the Piedmont and upper Coastal Plain, and farmers in these areas will need to consider the development of farming systems that maintain the soil. This may mean less emphasis on cotton and more on hay, pasture, and livestock in order to maintain more of the land in sod and close-growing crops.

The growing industrialization of the South will provide larger nearby markets for milk, eggs, meat, and fresh vegetables and fruit. Some of these products may gradually replace a part of the cotton acreage to the advantage of southern farmers. Peanuts and sweetpotatoes may find a larger place in southern farming both as food crops for the markets and as feed crops for livestock.

Of greatest importance in the Great Plains and Intermountain States is the question of achieving income stability on farms and ranches despite wide variations in weather conditions. Small irrigated areas in widely scattered locations can be further developed to function as stabilizers of the surrounding range and dry-land farming areas. Increased attention needs to be given to dry-farming practices that conserve moisture and prevent soil blowing. Range livestock production will need to be adjusted to available grazing and feed supplies. As previously mentioned, the future of wheat needs to be considered in terms of both feed and food uses.

The tremendous pre-war and wartime shift of population to the Pacific Coast is the most important factor to consider with respect to the future of farming in this region. A large part of the new population is likely to remain; and for farmers this means a larger nearby market than before the war. New irrigation developments are under way in the Columbia Basin of Washington, the Central Valley of California, and in some other areas. These developments will provide post-war settlement opportunities for some returning veterans and for other young men with farm experience, but there is some danger that new land developments may exceed the growth in market outlets. Development of farming systems in these new areas needs to be geared into the prospective increase in local demand for farm products by urban consumers.

Many of the older farming areas on the Pacific coast are producing specialized fruit and vegetable products that are dependent upon export or the distant eastern markets for their prosperity. Farmers producing these crops have a very considerable stake in recovery and maintenance of a high volume of international trade, as well as in the continued prosperity of domestic consumers.

Management Problems in an Era of Change

Rapid changes in farming in all regions seem inevitable in the post-war period. These changes are required to meet changes in market

conditions, to take advantage of new production techniques, new machines, new crops, new varieties, and new developments in processing and transportation. Changes in farm production are made by individual farmers on their own farms, and are therefore the result of decisions by several million farmers. The farm operators who are on the alert to adapt their business to changing conditions usually benefit financially from the change. At least they escape from being caught in the whirlpool of unfavorable events or are able to minimize effects of situations beyond their control.

In periods of stability farmers can continue to operate in the same way year after year and can count on approximately the same returns for their efforts, but when rapid changes are called for, those who are not in a position to respond may suffer severe losses in income. The small farmer, who is least informed about the need for changing his operations, is likely to be most vulnerable in periods of rapid change. Moreover, mechanization and other improvements in technology make it possible for family-operated farms to be larger in size than they were in former years. This development further widens the gap in prospective returns between the good and the poor managers.

In the post-war period a large number of farmers will need help in analyzing the desirable changes in farming in their areas, in determining the probable income effects of prospective changes, and in developing and carrying out practices that result in lower cost production. More research, education, and assistance with farm-management problems will be called for than ever before by farmers who will be seeking guideposts that point the direction of changes that will be required—changes needed not only in the interest of larger incomes, but sometimes in order to survive in the farming business.

PEACETIME TASKS IN MARKETING FARM PRODUCTS

In the conversion from peace to war the most pressing problem on the food front was to obtain greater production of the raw materials for food. In some cases marketing facilities and materials also presented a problem, particularly for dehydrated foods and for handling the greatly expanded production of domestic oilseeds to replace the large volume of oils and oil materials previously imported. With these and other important exceptions, however, the marketing system was found to have a great deal of surplus capacity, and it was able to handle the increased output without the vast additions to processing and handling facilities that were necessary to meet our needs for other munitions of war. The really difficult war problems in food marketing were in the fields of price control and allocation of the available production.

In the reconversion from war to peace an opposite situation will be encountered. Agricultural production will be much larger than in pre-war years, and relative output of the various farm products will be geared to wartime rather than to peacetime needs. Whereas, in the case of industrial reconversion, there will be a sudden stoppage of war output and a complete shift to peacetime products for which there is a vast accumulated demand, the agricultural production plant will go on

producing much the same kind of products. Experience indicates, also, that any downward adjustments in production of individual commodities to peacetime requirements will be relatively slow and difficult to effect. Under these circumstances, the marketing system will be charged with finding satisfactory outlets for at least partially continuing wartime levels of production.

It is evident, therefore, that reconversion of agriculture from war to peace will be more difficult than was the conversion to war. Moreover, reconversion difficulties will be more pronounced in agriculture than in most other industries, and more pronounced in agricultural marketing than in agricultural production. The big post-war problem for a number of years in urban industry will be to get back into mass production of civilian goods. Selling of industrial products will be relatively less difficult. In agriculture, on the other hand, marketing problems will become of larger relative significance.

Enlargement of Pre-War Problems

Most post-war marketing problems in agriculture will be an enlargement of problems that prevailed before the war. Food production has never been sufficient to meet minimum nutritional requirements for the world's population. Nevertheless the output of many commodities has exceeded the quantities that could be disposed of on world markets at satisfactory prices. Chronic "surpluses" of food, in the face of widespread malnutrition, have long been one of the worst anomalies of our civilization and have shown up basic weaknesses in our distribution system. If we are to take full advantage of technological progress, which makes it possible to produce adequate foods for all the peoples of the world, these weaknesses must be remedied. It will be ineffective to urge increased production unless we see to it that the food produced is properly utilized. Briefly, the problem is to avoid waste of natural and human resources devoted to the production of food supplies and, simultaneously, to insure reasonably good returns for agricultural producers through an expansion of market outlets. This over-all problem has a number of components the handling of which will require sufficiently flexible plans to meet a wide range of possible economic conditions.

Necessarily the planning job will rest partly on private marketing agencies and partly on Government agencies. Unavoidably, the war has produced frictions between marketing concerns and the Government agencies that administer wartime control programs. It seems to be realized, nevertheless, that the private and the public agencies have a common interest in numerous marketing problems. In the irritations of the moment the agricultural businessman may long for absolute freedom of action; but when he considers what might happen if all Government controls were removed suddenly, he generally sees the need for discriminating action and also for continued cooperation in dealing with the marketing situation. He realizes that at best the situation will be difficult and at worst could be disastrous.

Plans for dealing with post-war marketing problems for agriculture must be based on facts and analyses. Otherwise, it will not be pos-

sible to avoid costly mistakes. For example, the producer of dehydrated foods for the armed forces, when he tackles his conversion problem, must have information about prospective consumer preferences for alternative types of processed products, about prospective technological improvements in different processing operations, about the prospective relative supplies of different products, about potential export outlets, and about the probable actions of other processors. Most private agricultural marketing agencies do not have large research staffs. Hence the necessary information must be provided by public agencies. Much information will be required also in connection with the revision of Government programs to meet postwar conditions.

The Wartime Controls

One problem in dealing with post-war conditions in agricultural marketing will concern the wartime regulations and controls. Some of these regulations, such as those designed to reduce the number of deliveries of milk and to stop the sale of bread on consignment to retailers, may be found to have such desirable results that we will want to continue them even in peacetime. Some private marketing agencies and associations have expressed concern over the possibility that the savings effected by wartime regulations in the distribution of milk may be lost by a return to completely unregulated competition. It might then be more difficult for the fluid-milk industry to compete with lower priced substitute products.

Export Marketing Requirements

Knotty marketing problems will arise in connection with our exports. During the war our exports of farm products for use by the armed forces and our allies have greatly increased. On the other hand, our commercial exports have dwindled to very small proportions. How may we regain and, if possible, expand our commercial export outlets when the war is over? Upheavals in world political and economic conditions will complicate the problems, which will have a bearing on international finance, exchange rates, shipping, and purchasing power in various countries.

High hopes have been expressed that we shall have a vast resurgence of international trade after the war, encouraged by new types of international organization and by an awakening of the peoples of the world to the political pitfalls and economic disadvantages of narrow economic nationalism. Realizing these hopes, however, will call for hard work and mutual sacrifice, as well as a sharing of the benefits. Our cotton producers, for example, will have to consider under what price conditions they should try to promote expanded world takings of American cotton. High prices, in comparison with those of other nations, could practically stop the flow of cotton exports. On the other hand, will producers in other countries be willing to go along on a reasonable basis for dealing in world markets, or will they resort to cut-throat competition of the sort which disrupts world markets and leads to eventual maladjustment everywhere? Policies

in international trade are the key to satisfactory or unsatisfactory dealing with many domestic problems.

Outlets for Wheat and Cotton

During the marketing year 1943–44 perhaps 470,000,000 bushels of wheat were fed to livestock in this country. In ordinary times price relationships would prevent the diversion of such large quantities to this use. Something will have to be done when the war is over to find an outlet for the excess of wheat above the domestic human requirements. In the recent past the excess has amounted on an average to about 150,000,000 bushels annually. It is obvious also, that wider outlets for cotton will have to be found if there is not to be a large excess above domestic consumption. New uses for cotton created by technological improvements will be offset more or less by the inroads of synthetic fibers such as rayon. Rehabilitation of liberated countries will help to absorb what otherwise might be large post-war surpluses. But foods and fibers for the liberated nations will furnish merely a partial and temporary offset to reduced Government war buying for the armed forces and lend-lease.

Progress in Food Processing

The war has greatly accelerated technological progress in relation to food processing and marketing. It has retarded the commercial development of some methods such as freezing, owing to the shortage of equipment and manpower, but the end of the war will presumably remove this handicap.

Many of the technological developments in food utilization which have been introduced during the war to meet special problems such as the shortage of shipping space and the lack of refrigeration facilities in areas of hostilities no doubt will be abandoned after the war. But so many new developments are in prospect that it is safe to predict that eventually a virtual revolution in the marketing of perishable agricultural commodities will take place. This will help to raise standards of living of the world's population, will further the international exchange of foodstuffs, and will open up new markets for producers of some agricultural commodities. It will bring problems, however, as well as benefits. Both producers and marketing agencies will face new types of competition. Specialization of production will be promoted, and many shifts in production probably will result from these marketing developments.

Important among these newer technological processes are dehydration, the preservation of food by freezing, and air transport. Although dehydrated foods have certain disadvantages in competition with fresh, frozen, and canned products as now sold in the more highly developed centers of consumption, they should as a result of improved air transport make available to what are now relatively inaccessible markets a larger variety of foods. Improvement in present processes of dehydration will result in better quality products. Dried milk promises to become an important competitor of fluid milk.

It may greatly affect the geographical distribution of production and force long-overdue economies in the distribution of fluid milk.

The freezing of fruits and vegetables, meat, and possibly other perishable foods makes possible the furnishing of a seasonally stable supply of these foods. They have superior quality and nutritive content and offer many conveniences to the ultimate consumer. Such freezing will result in important changes in the processing and distribution of many foods, particularly fruits and vegetables, meats, poultry and eggs, cream, and possibly even milk. These shifts may give rise to entirely new types of retail dealers in foodstuffs handling frozen perishables. The operations of wholesale dealers, terminal produce markets, and chain-store organizations will be vitally affected. Canners may be forced to shift to new types of operation. New and different storage facilities will be necessary. Transportation will be largely affected. There will be a need for new types of refrigerator cars, trucks, and other transportation facilities. The relative advantages and disadvantages of production areas for fresh perishable products will be greatly altered by these changes in marketing. Changes in the seasonality of prices may reduce the advantages now held by producers in early market areas.

Marketing Techniques in Post-War Years

Studies already made show that air transport of some fruits and vegetables is practicable in competition with present modes of transport and distribution in a country like the United States and undoubtedly will play an important part in improving the diets of other populations to whom many types of healthful foods are now unavailable. The release of large quantities of air-transport equipment and personnel from war activities and the use of airport facilities which have been constructed throughout the world for the prosecution of the war will result in a development of air transport far in advance of that which would have occurred under normal conditions.

Experience in the handling of large quantities of both perishable and nonperishable foodstuffs in supplying the armed forces under extremely difficult climatic and other conditions will serve as a basis for improved storage and other techniques during peacetime.

Among new problems which will be presented and among existing problems which will become more urgent are the following: (1) Conversion of food-dehydration facilities to peacetime uses; (2) the use of air-transport equipment and personnel of the armed forces in transporting farm products; (3) the marketing of dried milk in relation to the established fluid-milk markets, and impacts on specialized dairy production areas; (4) post-war needs in retail food-distribution facilities, with special reference to types of supermarkets needed in view of the prospective large development of frozen foods; (5) the orderly development of the frozen-food industry to prevent gluts and other difficulties which may arise from too hasty conversion and lack of distribution facilities and home-storage equipment; (6) the development of precooked frozen foods, with special reference to in-

stitutional uses; (7) post-war needs for assembly and processing facilities to meet new technological developments, such as extractor, cleaning, and conditioning equipment of cotton gins to care for mechanically harvested cotton, the installation of high-density compressors at gins and of long-draft spinning equipment in mills to facilitate the use of a wider range of staple lengths of cotton without adjusting the frames; (8) readjustments in oil processing facilities to care for post-war changes in the composition of the fats and oils supply; (9) the determination of the possibilities for broadening markets and reducing costs of marketing perishables with portable refrigerated shipping containers; (10) the determination of consumer preferences in relation to a wide variety of new products and other questions; (11) determination of manpower requirements in marketing in relation to the problem of unemployment; (12) the determination of suitable arrangements for marketing agricultural surpluses internationally, including possible facilities for the physical handling and sale of commodities moving outside the ordinary commercial trade channels without directly affecting pricing in commercial transactions.

A second possible post-war development in the field of marketing which may become very significant is the introduction of consumer grades and standards on a much larger scale. This does not mean the enforced elimination of private brands and competitive merchandising practices, but rather the gradual introduction of standard grades for foodstuffs at the consumer end of the marketing system along lines which have been gradually becoming more effective and important at the producing end. This could have very real beneficial effects on marketing costs and methods. Thus, even the dry-grocery fields, which will remain relatively unaffected by the new techniques of processing referred to above, may undergo important changes in the post-war years.

WAR'S EFFECTS ON FINANCIAL POSITION OF FARMERS

So far during this war, agriculture has felt mainly the stimulating influence of wartime buying and of the credit expansion incident to war financing, though this influence has been modified by the restraints of price control. As usual, while a war is in full blast, the stimulating forces have predominated.

War has greatly enlarged the flow of funds into and out of agriculture. Cash farm income from 1940 to 1943 from products sold and from Government payments rose from 9.1 billion dollars to 19.9 billions, an increase of 119 percent. Gross farm income during those years increased faster than total production costs even including the cost of hired labor. As a result, the total net return from agriculture to labor and investment increased from about 6.5 billion dollars in 1940 to 15.8 billions in 1943. The net income of farm operators and their families from farm operations plus Government payments, including an adjustment for changes in inventory, increased from about 4.8 billion dollars in 1940 to 12.4 billions in 1943.

As noted elsewhere in this report, the increase reflected higher prices

and increased production, with price gains exercising the greater influence. Production, as measured by volume of farm marketings and home consumption, increased 17 percent during the period, while prices received for farm products rose 92 percent.

Agriculture in the United States, as measured by the dollar value of its physical plant, grew from a 49-billion dollar industry to a 70-billion dollar industry during the 4 years ended January 1, 1944. The addition of certain intangibles owned by farmers, such as cash, deposits, and United States savings bonds, would rate agriculture as a $54,000,000,000 industry in 1940 and as an 83-billion dollar industry in 1944. The equities of all owners of farm land and of all tenant farmers appear to have increased during these 4 years by nearly 30 billion dollars. On the other hand, the combined net holdings of mortgages and other lenders to agriculture have declined by half a billion dollars or more. Farmers, as a group, have reduced their indebtedness. In short, the financial position of the farm business has strengthened during the war years. Naturally, however, many farmers have not done so well as the group, whereas others have done better.

Limited Increase in Physical Plant

The farm physical plant has increased in size only to a limited extent. This increase has been greatest in livestock and moderate in crop inventory. In land, buildings, and machinery there has been practically no increase. The prices of tangible farm assets, by which valuations are calculated, however, have increased sharply, about as follows: Land, 36 percent; meat animals, 85 percent; crops, 126 percent; farm machinery and vehicles, 24 percent. In the aggregate, higher prices account for about 19.7 billion dollars of increased valuations of tangible farm assets. A rise in physical working capital accounts for an increase of about 1.4 billion dollars, making a total increase of 21.1 billion dollars in the value of tangible assets between 1940 and 1944. Simultaneously, the intangible assets of farmers, in such forms as United States savings bonds, cash, bank deposits, and warehouse receipts, increased some 8 billion dollars. These increases in farmers' assets, which total 29.1 billion dollars, when combined with the 500- to 800-million-dollar farm-debt reduction that has taken place in the war years, indicate that the interest of the proprietors in agriculture on January 1, 1944, was nearly 30 billion dollars larger than on January 1, 1940.

The farm business as a whole, despite its response to wartime stimulation, seems to have been conservatively managed in the war period. It has not borrowed so much as it did during the previous war—at least, not yet. Farmers are using their increased incomes to pay their debts and to put their business in a generally stronger condition. But the danger of inflation is not yet over, and the problems of peacetime readjustment lie ahead.

CREDIT FACILITIES FOR AGRICULTURE

Credit for agriculture, both long-term and short-term, is now generally available at reasonable rates. In post-war years, however, several credit problems may arise which will need attention and, in

some cases, specific action. Among the more important of these are: (1) Credit to assist veterans and others to become established on farms; (2) credit to aid farmers to shift from one type of agriculture to another where changed conditions make such shifts desirable; and (3) credit to carry out soil and water conservation measures and to adopt good forest-management practices.

Veterans and others who expect to engage in farming during the immediate post-war years should be careful not to become overloaded with debt which may be very difficult to repay later if prices of farm products fall materially. In many cases it will be much better to delay purchasing farms for a few years, to operate as a tenant or laborer in the meantime, and to accumulate more cash for a down payment, than to go heavily into debt now. If a farm is purchased, the mortgage debt should be amortized over a long period, with the privilege of advance payment in years of good income. Short-term credit should be limited to what can reasonably be expected to be repaid from farm operations within a 2- or 3-year period; otherwise, debts accumulated during high-cost periods may have to be repaid in years of much lower returns.

In many areas, material changes in farm enterprises have been made to meet wartime demands. For instance, many farmers in the vicinity of military camps and war industries in the Southeast have engaged in intensive dairy, poultry, or truck-crop production on a scale that will not be justified if and when the population of these areas returns to pre-war figures. Shifts to a less intensive type of agriculture will then need to be made. Special credit arrangements may be required to assist farmers in making such shifts.

Where conservation measures have been neglected during the war period of largest possible production, credit at low interest rates will be needed to promote conservation of soil and water resources, benefits from which may not be immediate but which may be expected to accrue over several years. Rapid depletion of forest resources during the war period emphasizes the need for general adoption of sustained-yield management and the reforestation and improvement of millions of acres of forest lands in private ownership. Credit on acceptable terms to put such practices into effect is not now generally available. Provision needs to be made for long-term credit at low interest rates to aid in the rehabilitation of these lands.

Increased Demand for Mortgage Credit

Farm finance in the year ended June 30, 1944, was characterized by an increased demand for new farm-mortgage credit, by a large reduction in the total farm-mortgage debt as a result of more than offsetting repayments on old farm-mortgage loans, by a strong demand for short-term loans to finance the production of crops and livestock, and by an increasing need of farmers' cooperatives for credit to finance their war-expanded programs.

These factors all reflected greatly expanded farm production and a record farm income. Farm prosperity also was indicated by the small number of farm foreclosures, farm bankruptcies, and delin-

quencies in loan repayment. The number of farms owned by lending institutions continued to decline.

Farmers and their cooperatives used more than a billion dollars of credit obtained from units of the Farm Credit Administration during the year. This was the largest amount borrowed by farmers and their cooperatives in any similar period since the organization of the Farm Credit Administration in 1933, except 1934–35—the peak year of the tremendous farm-mortgage refinancing program.

Extended total short-term operating credit declined slightly, because of the smaller loan volume of the Regional Agricultural Credit Corporation of Washington, D. C., but farm-mortgage loans and loans to farmers' cooperatives increased, bringing the total loans to the peak amount.

Operating credit extended by units of the Farm Credit Administration for the year ended June 30, 1944, amounted to $546,367,442, as compared with $581,740,884 the year before.

Wartime demand for credit from the production credit associations greatly expanded during the early war years but levelled off for the year ended June 30, 1944. This resulted from several factors which balanced out their effects. Two of the main factors were: (1) The large number of farmers who had built up their savings from good years, and consequently could operate without credit; and (2) the offsetting influence of farmers who needed larger amounts because of higher prices for feeds and supplies used in producing crops and livestock and because of their expanded production programs. Farmers and stockmen used 226,154 loans during the year from their 517 production credit associations, totaling $502,006,000. The number of members borrowing was about 2.4 percent fewer than during the previous year.

The cooperative production credit associations made a substantial gain toward farmer-ownership. Capital owned by members, farmers and stockmen, on June 30, 1944, accounted for 30.6 percent of the total, as compared with 24.2 percent a year earlier.

Credit for Cooperatives

Because of their war-expanded operations, farmers' cooperatives continued to need large amounts of credit. As a result, the 13 banks for cooperatives increased their loan volume 28.7 percent over that of the previous year. Credit extended for the year totaled $471,250,498, or more than four times the pre-war 1940 volume. Included are funds advanced to finance cooperatives' participation in the lend-lease program and the Commodity Credit Corporation loan program.

A large part of this money went to cooperatives engaged in producing vital war products—powdered milk, dried eggs, canned and dehydrated fruits and vegetables, cottonseed oil, soybeans for protein feed and oil, wool, raisins for military and lend-lease requirements, and other products.

In keeping with the times, the banks for cooperatives financed a number of new and some unusual activities. These included the production of hybrid seed corn, cleaning and marketing of edible peas,

sweetpotato dehydration, the dehydration of alfalfa, fiber flax processing, and rice drying. Cooperative bank financing assisted one cooperative in buying ammonium nitrate, a fertilizer product, from the TVA, and distributing it to the association members.

In the past few years the number of cooperatives borrowing from the 13 banks has decreased while the amount of money loaned has increased. Many cooperatives have built reserves sufficient to take care of any seasonal needs for additional capital and no longer need to borrow. On the other hand, the larger volume of goods handled by many of the borrowing cooperatives, coupled with higher prices for farm products and supplies, has made it necessary for them to use much larger amounts of credit.

Long-Term Loans

The 12 Federal land banks, through a Nation-wide system of about 1,200 national farm loan association offices, made long-term land bank and Commissioner loans amounting to $96,700,517, an increase of 20.4 percent over the previous year. This money went to 21,202 farmers, or 18.9 percent more than the year before. The average amount of money going to each farmer-borrower was only slightly more than the previous year, $4,500 in 1943 and $4,560 in 1944.

New developments in the farm-mortgage credit field during the past year may tend to level off the decline in the total farm-mortgage debt; in fact, there is a possibility of an upward trend because the amount loaned by all lenders shows increase and the average-size loan being made by all lenders has increased. The size of loans made by individuals has registered the largest increase. All indications are that, in the main, these larger loans are being used to finance the purchase of land, and the number of farm sales is increasing. For the year ended March 1, 1944, these sales were 53.1 per thousand farms, compared with 44.7 per thousand the previous year, and 48.7 in 1919, one of the boom years after the first World War.

Farmers were the principal purchasers—they bought about two-thirds of all farms sold in the United States. In some areas, particularly the Mountain and West North Central States, they bought about four-fifths and three-fourths, respectively, of all farms sold.

Coupled with the large demand for farms is the rise in farm-land prices. The 15-percent increase in sales prices for the year ended June 30 was added to a 1 percent a month rise the previous year. The rate of increase during the year was higher than for any year on record, except the post-war boom year 1919–20, and it represented about three-fourths of the increase recorded in that year.

Some farmers are buying land for the first time, others are rounding out their acreages, and some established farmers are investing their savings in additional farm land. These purchases may be dangerous to thousands of farmers, particularly those who are overloading themselves with debt as so many did during and after World War I. Farm-mortgage debt increased about $3,000,000,000 during the 1916–20 period. After 1920 much accumulated short-term indebtedness had to be converted into farm-mortgage debt. The total then rose about $2,000,000,000, reaching a peak of $10,786,000,000 in 1923.

FARM INCOME

Farm-income prospects for 1944, which fall and winter developments may change, should be set against the background of the previous war years. The net income of farm operators from current operations in 1943 amounted to 11.4 billion dollars, compared with 8.6 billion in 1942, and a pre-war (1935–39) average of 4.3 billion. Government payments increased the net to 12 billions, which is 30 percent greater than the net income including Government payments in 1942. The nationl income increased from about 120 billion to 148 billion dollars. Net income from agriculture to persons living on farms increased between 1942 and 1943 by almost exactly the same percentage as the increase in income from all sources to persons not living on farms.

The increase in net farm income from 1942 to 1943 resulted from some increase in production, combined with a considerable advance in prices. Production for sale and for consumption on the farm increased from 124 to 129 percent of the 1935–39 average. It reached an all-time high at 43 percent above that of 1918. Ordinarily, increased production results in lower prices, but not in wartimes. The average of prices received by farmers for products in the year increased from 159 to 192 percent of the 1910–14 level. (In 1918 prices averaged 204.) Cash receipts from marketings increased about 25 percent—a 4-percent increase in production accompanied by a 21-percent increase in the average of prices. Production expenses increased also, but only 16 percent. Net income of farm operators in 1943 was thus about 30 percent higher than in 1942.

Farmers in all parts of the country shared in the increase in income from agriculture in 1943. Receipts from marketings increased from $15,000,000,000 to $19,000,000,000. The greatest increases were in the North Central and Western States, the smallest in the Atlantic Coast States. The only important items that did not register increases were wheat and sugar beets, the production of which was reduced. Reductions in receipts from these crops, however, were more than offset by increased returns from other products of the same producing areas. A major part of the increase in receipts resulted from greatly increased marketings of livestock products. Fruits yielded larger incomes because of higher prices, despite small crops. Potatoes and some other vegetable crops brought increased returns from crops larger and prices higher than in the previous year.

Conditions in July indicated that the volume of farm marketings in 1944 would be somewhat greater, and that prices might average slightly higher than in 1943. In other words, the income from marketings in 1944 seemed likely to be somewhat greater than in the previous year. In the first half of 1944 receipts from marketings exceeded those of the first half of 1943 by about 11 percent. It was doubtful, however, that the receipts in the remainder of 1944 would exceed the high level of the latter half of last year. Moreover, the average of prices received declined toward the summer from the high level of 196 reached earlier in the year.

Farm Income Position in 1943

The per capita net income per person on farms in 1943 was then considerably above the 1910–14 parity. It has been above that level since 1941 and was above it in 1918–19. In 1943 it was estimated that the per capita net income from agriculture, including Government payments of persons on farms, was $491. Estimated per capita net income from all sources of persons not on farms was $1,243. Though apparently low in relation to the per capita income of persons not on farms, the per capita income from agriculture per person on farms is relatively higher than it was in the base period 1910–14. Average income from agriculture per person on farms was then only 28 percent of the average income per person not on farms. In 1943 it was 40 percent.

Measured in this way the income from agriculture per person on farms in 1943 was 143 percent of what it was in the period 1910–14. Similarly reckoned, this income was 135 percent of parity in 1942 and 90 percent in 1940. The agricultural income rose above parity in the World War I period. In 1918, for example, it reached 164 percent of parity. Between 1918 and 1921, however, the net income from agriculture dropped to 60 percent of parity. This is a reminder of how rapidly the situation can change.

During the present war, farm production has been greatly increased with some reduction in numbers of persons engaged in agriculture. In the period 1910–14 about 12 million persons were annually engaged in agricultural production. By 1939 the number had been reduced to 10.7 million. Now it is about 10.3 million. Yet production is almost 30 percent above 1939, and 50 percent above the earlier (1910–14) pre-war level. This has a bearing on recent changes in the relationship of farm to nonfarm income.

In the years 1910–14 the average annual net farm income per worker was about $366. In 1943 the corresponding figure was $1,362. In other words, the average income per person engaged in agriculture in 1943 was 372 percent of the average before World War I. In the same period the average annual wages per employed industrial worker increased from about $583 to $2,156, or to 370 percent of the 1910–14 average. If we regard the 1910–14 relationship as a parity relationship, then we can say that in 1943 the income of persons engaged in agriculture just reached parity with the income of industrial workers.

Farm crops brought liberal farm returns in 1944. Total receipts to farmers from marketings amounted, for the entire 12-month period, to about 20 billion dollars. This was 4 percent more than the receipts from farm marketings in 1943, and four times the corresponding income from marketings in the depression year 1932. Receipts from marketings of crops were up 13 percent from 1943. The year's record wheat crop (1,079,000,000 bushels) was a big factor in the income from crops. On the other hand, income from livestock and livestock products was down about 2 percent below that of the previous year, as a result mainly of slight decreases in the receipts from meat animals and poultry products. Receipts from fruits and nuts increased 21 percent over

1943. From all crops, income from marketings was 8.9 billion dollars; from all livestock and livestock products, 11.1 billion dollars.

As farm production in war-torn countries and international trade return to normal, however, the United States may have to readjust its agricultural production to a more nearly normal demand basis. The production response to prices and to promised supports for potatoes, eggs, and hogs was so great in 1943 and early 1944 as to produce surpluses over current requirements. It created difficult problems in supporting markets for short periods. This happened in the face of record demands. In these cases the surpluses were only temporary. In the next 12 months there may be no surpluses of these commodities. But we are harvesting a record wheat crop, which will provide a supply large enough to be at least temporarily a burden on price-support measures. Moreover, Canada too is harvesting a large crop. Exportable supplies in these two countries alone will be adequate to meet any prospective European requirements in 1945.

These supplies probably will not be burdensome next year. But restoration of international movements of grain from other surplus-producing countries, together with some recovery of grain production in Europe, could result in a really burdensome surplus of wheat, particularly if the United States has another large crop in 1945. We have on hand large stocks of wool and cotton, with consumption declining. The war-emergency demand for these commodities is shrinking. Some of our stocks of these textile materials can doubtless be placed in Europe in the period of European recovery and reconstruction. Producers of wool and cotton, however, will face the competition of accumulated stocks in other countries, and consequently the prospect of a sharp reduction in world prices. Producers of fats and oils must plan to meet an increase in supplies from the East Indies shortly after the war in the Pacific ends. Maintenance of high purchasing power in the United States will contribute support to the market for fats and oils, but will not be sufficient in itself to keep prices at current or parity levels.

THE YEAR'S PRODUCTION

Near calamities, which at different times threatened crop production in nearly every State, characterized the farming season of 1944. Yet the final result was about as large a volume of crops and livestock products as this country has ever produced.

The fall of 1943 was dry and December and January were dry, except in the Southwest. Millions of acres of winter wheat failed to germinate before cold weather arrived. In the far Western States the usual period of winter rains passed without giving adequate moisture to the soil, and with little snow in the mountains to provide water for irrigation. In the central and eastern Corn Belt wells went dry, winter wheat made little growth, and wheat and clover seemed destined to suffer from lack of the usual snow cover. There seemed to be signs that we were running into a drought season.

In the late winter, however, the period of dry weather ended abruptly. From February through April rainfall in the farming areas was the heaviest at that season in 30 years. Wheat in the Southwest, which had been seeded in the dust, began to grow; some wheat growers planted additional acres. Large areas in the East began to have too much rain. The lower Missouri River reached flood levels untouched in a hundred years. But cool weather kept the fields from drying and hampered seeding.

In March and April, when it was time to seed oats in the Corn Belt and corn in the Cotton Belt, hundreds of thousands of farmers could not get into their fields. Their tractors and other equipment would bog down. Though nearly all the intended acreage of oats was finally sown, the seeding was very late. In the central Corn Belt, where the heavy rains continued into May, farmers were late with corn planting. On the other hand, the northern Plains had dry spring weather and farmers were able to plant in good season, but the supply of moisture in the soil there seemed inadequate. The spring was late throughout the West and the North; grass on ranges and in pastures was slow in starting, and shortages of hay and feed developed.

Nevertheless, though many crops went in late, the acreage of principal crops harvested may total about 352,000,000—about 1½ percent more than the acreage harvested in 1943, and about 9 percent more than the acreage harvested in 1939. In fact, this year's harvested acreage is probably the largest since 1932. Except where floods and other obstacles stood in the way, farmers planted practically all the available productive cropland. The acreage devoted to grains, hay, and forage crops exceeded 300,000,000 and for each crop was close to the goal. Farmers grew somewhat more oats, somewhat less hay, somewhat more sorghums, and somewhat less corn than had been considered desirable. The deviations from the goal acreage, however, were small in view of the difficulties encountered in the planting season. Acreages devoted to other crops, though in many cases below their goals, were as large as the farmers believed they could handle. In general, the crops that required a large amount of labor did not reach the acreage goals.

For example, acreage planted to cotton was only 20,356,000, nearly 2,000,000 below the goal and the smallest acreage planted since 1895. Likewise below the goals were acreages planted to potatoes, sweetpotatoes, tobacco, beans, peas, soybeans to be threshed, peanuts for nuts, and sugar beets. In these crops the acreage was only about 22,800,000, or 7,000,000 below the goals' total and more than 1,000,000 acres below last year's plantings of these crops, though 8,400,000 acres, or 58 percent, above the 1933–42 average.

In June and July dry weather began to hurt crops in most of the area from the Gulf northward to the Ohio and Potomac Valleys. By early August, drought conditions were hurting pastures and growing crops from the Rio Grande in Texas to northern Maine, and from central Missouri to Virginia. Some crops were damaged irreparably; but late corn, tobacco, sweetpotatoes, and some other crops recovered after rains in late August and early September. Over the country

as a whole, nevertheless, the damage from drought was less than in most recent years. In the early fall it began to be apparent that the total harvest would be huge if frosts held off until the late-planted crops had time to mature.

Outturn of Some Major Crops

Wheat production, estimated at 1,079,000,000 bushels, was 10 percent greater than in any previous year. Helped by timely spring rains and by mostly dry weather at harvest time, the average yield was 18.2 bushels per acre, the second highest on record. This wonderful showing, though partly attributable to the favorable weather conditions, was partly the result also of what has been done in recent years in developing new rust-resistant varieties.

Corn production is estimated at 3,228,000,000 bushels. This total exceeds the production of any previous year. Corn suffered from drought conditions in late July and early August over most of the east and south. But the 50,000,000 acres planted in the central and western Corn Belt produced an immense crop. The national average yield of 33.2 bushels per acre, which is above the national average in any year except 1942. This exceptional showing is attributable partly to the planting of hybrid corn on 57 percent of the total acreage.

Sorghums, favored by abundant rainfall in the southwest, are an outstanding crop this season. The quantity harvested as grain is estimated at 182,000,000 bushels as compared with the previous record output of 112,000,000 bushels in 1941. Farmers have increased grain production and decreased harvesting costs by making a further shift toward the low-growing kinds of sorghums which can be harvested with combines. Estimates of feed-grain production include 1,166,000,000 bushels of oats and 284,000,000 bushels of barley. These were just fair-sized crops because many fields were planted late. The rice crop of 70,000,000 bushels was nearly a record one. Production of buckwheat was above average. The crop of rye was very small.

Altogether the indicated production of grain is 156,000,000 tons, as compared with 142,000,000 tons in 1943, 155,000,000 tons in 1942, and from 120,000,000 to 136,000,000 tons annually in the preceding 5 years. This huge total will relieve feed shortages and obviate need for excessive marketings of livestock. Hay and roughage supplies, though not correspondingly large, appear to be adequate for a normal rate of livestock feeding this winter.

Cotton production, estimated at 2,359,000 bales, is a little above the average of the last half-dozen years. It now seems likely that the season's reduction in the cotton acreage will be nearly offset by a record yield per acre. Earlier in the season drought hampered the growth of cotton in some areas, but the dry weather reduced boll weevil damage.

Tobacco, according to the October estimate, was a near-record crop 1,800,000,000 pounds. The yield per acre was the highest on record. In most places tobacco had been threatened by drought, but timely rains saved it. Production of peanuts is expected to be one or two per-

cent lower than in either of the last two years but much higher than in earlier seasons. The crops of beans, dry peas, and soybeans are large or very large as compared with pre-war standards, though considerably below the production of last year. Potatoes and sweetpotatoes will be about average crops. Potato production at 379,000,000 bushels, however, is 86,000,000 bushels less than that of 1943.

Some Exceptional Figures

The season will show some exceptional figures in the production of fruits, nuts, and commercial vegetables. Tonnage of all fruits and tonnage of commercial vegetables will be the largest on record. Prospects for citrus fruits are very favorable. Record crops of tree nuts will be harvested. Among the vegetables grown for market will be record crops of cabbage, onions, and lettuce. The total commercial vegetable production for market will be a record. Vegetables grown for processing will probably show a larger tonnage than in any previous season except in 1942.

Farmers expanded their flocks and herds about one-third during the 3 years 1941 through 1943 and converted feed reserves into livestock and livestock products on an unprecedented scale. The huge production of grain in 1942, added to large supplies then on hand, permitted liberal feeding. Production of livestock (excluding horses and mules) and livestock products reached a peak in 1943, at about 36 percent above the production in any year prior to 1939. Aggregate production of cattle, hogs, and sheep in 1943 reached a total of about 46 billion pounds, live weight, compared with the pre-war peak of nearly 34 billions, reached just prior to the 1934 drought. Late in 1943 and in 1944, however, it became necessary for farmers to reduce numbers of hogs and poultry toward levels which could be maintained from current feed production. As a result, production of meat animals in 1944 declined.

This production in 1944 will probably be between 41 billion and 42 billion pounds, or about the same as that of 1942. Cattle production will be the highest on record, but hog production will probably be fully 20 percent less than in 1943. It may be less than in 1942. Milk production, which increased rapidly in 1940 and 1941 and reached a peak in 1942, was lower in 1943 and 1944 than in 1942 by a fraction of 1 percent. There was a further increase, however, in the quantity delivered as whole milk, and a decrease in the quantity skimmed on the farms and sold as cream. Production of chickens reached a peak in 1943; but production of eggs and of turkeys will probably be higher in 1944 than in any previous year. Combining all livestock and livestock products, production in 1944 will probably be 6 percent less than in 1943 but more than in earlier years.

The Estimated Aggregate

Adding aggregate production of crops to aggregate production of livestock and livestock products, and deducting duplicated items, chiefly crops fed or used for seed during the year, indicates a farm out-

put in 1944 about the same as in each of the 2 previous years and about one-fourth greater than that of any year prior to 1939.

COTTON AS A WORLD PROBLEM

The world's annual cotton crop has shrunk in the war period by about 3,000,000 bales as a result largely of the disorganization of cotton production in China and the Soviet Union, and of the diversion of cotton land to food and feed crops in Egypt and India. In most, if not in all of these countries, post-war production may be expected to recover quickly. China and the Union of Soviet Socialist Republics normally depend upon their own production to meet their needs. The wartime decreases in Egypt and India result from pressure of increased need for foods for the allied military requirement, from a shortage of shipping for the import of food and the export of cotton, and in India from the loss of Burma's rice surplus. Egypt has cut its cotton acreage by three-fifths, but after the war will almost certainly wish to lift its restrictions because cotton is its best income crop under normal conditions. India, when access to Burma has been regained and world shipping conditions have eased, will have a surer food position and will be able to devote more acreage to cotton.

Strong tendencies to expand cotton production have continued through the war years in Brazil, Argentina, Paraguay, and Mexico. New land is still abundant and cheap in the South American countries and national policies favor its development. Costs of production in terms of dollars and sterling are low. Moreover, the demand for cotton in the industrial and creditor countries of Europe fits the crop to the economies of Latin American countries. Production in several of these countries seems likely, therefore, to continue to increase even if prices decline considerably. The point at which it will level off is not yet in sight.

In a minor way the restoration and expansion of cotton growing are to be expected in Europe. Spain, Italy, Greece, and Bulgaria have successfully promoted cotton growing under pressure to improve their foreign-exchange positions, and their production, combined with that of Turkey, could provide Europe with half a million bales or more annually in the not-too-distant future. France has had some success with cotton in its colonies, particularly in French Equatorial Africa, and has indicated a wish to develop an extensive program. Belgium in the Congo and Portgual in Mozambique are likely to press their cotton enterprises to a larger development.

Consumption and Stocks in War Years

Throughout the war period the avenues of cotton movement to the European Continent and the Far East have been closed and, notwithstanding the decline in world production, cotton supplies have accumulated in the producing countries. On August 1, 1943, world stocks were estimated to be about 1½ million bales greater than in 1938, when they reached their highest earlier peak of 22¾ million bales, and in August 1944 about as large as the year before. Significantly, the stocks of

foreign-grown cottons are now about 3½ million bales greater than in 1938 and 5 million bales greater than when the war started, in 1939.

Consumption of cotton in the world is now probably no more than about 24 million bales a year—roughly 4 million bales below the pre-war rate. This is true in spite of important increases which have taken place in the Western Hemisphere countries and in India. In the United States mill consumption under pressure of the military demand is now about 3½ million bales above the pre-war average. Canada also has increased its consumption by not quite a quarter of a million bales; Latin America by more than half a million bales; and India by about one million bales. By contrast, in most of the remaining countries of the world, among which are included nearly all of those to which the United States has customarily exported cotton in volume, wartime consumption has been sharply restricted. Their aggregate consumption is now 9 million or 10 million bales below its pre-war levels, and has been offset only partially by increases in rayon consumption.

Consequently, acute shortages of clothing and of cotton goods have developed in many countries. To the extent that they have purchasing power, these countries will want to make substantial new purchases of cotton goods or of cotton. Mill activity in many cotton-manufacturing countries should be greatly stimulated in consequence, especially in those which have been depressed. Success in stabilizing the exchange value of foreign currencies would be extremely helpful at this stage. In countries with insufficient foreign exchange, relief distribution of cotton goods may also be a factor. It would seem unwise, however, to count too heavily on the present shortage of textiles for the long-time recovery of our cotton export trade. Similar conditions after World War I gave rise to intense activity, but it lasted only about a year and a half. The next phase was drastic price deflation. Even in 1919–20, cotton consumption outside the United States failed to attain the levels of earlier years.

The Historic Trend

For a century or more world consumption of cotton has fluctuated with peace and war and with prosperity and depression. Yet so far the long-time trend has been upward. In the period 1914–39 the increase was nearly one-third. This quarter century, however, witnessed important shifts in cotton consumption which have significance from the standpoint of today. In the first place, a marked decline took place in the relative importance in cotton manufacturing in the highly industrialized countries of Europe. The gains were mainly in the United States with its large population increase and in countries less developed industrially, most of which were themselves also producers of cotton. Secondly, in the highly developed countries, the peacetime consumption of cotton goods on a per capita basis showed little tendency to rise. Increases in their consumption of textiles appeared to be reflected in an increased per capita consumption of textiles made from synthetic fibers rather than from cotton. These long-time trends or tendencies will probably continue after the return of peace.

World consumption of cotton, though diminished by the war, should rise to new heights eventually; but the major increases may take place in countries in which the per capita consumption has heretofore been small and in countries which in former years have exported raw cotton or imported cotton goods or done both these things.

Among the most important of such countries are India and Brazil. Both of them have increased their cotton consumption during the war years. India's experience in this war has been not unlike Japan's in the last. India will emerge from the war not only self-sufficient in cotton-goods production, but in a position also to become an exporter of cotton goods. Largely, of course, India will utilize its own cotton and will import only qualities not grown in India in sufficient quantities. The fact that India has a large fund of sterling suggests that its import of cotton may be drawn largely from countries of the sterling area, British East Africa in particular, and possibly Iraq, Egypt, and the Sudan. Brazil has increased its cotton consumption to about the equivalent of 900,000 bales, or to something less than 40 percent of its raw cotton production. It is now an exporter of cotton goods as well as of raw cotton. Brazil hopes to continue as an exporter of cotton goods but it is not a low-cost manufacturer. In any case its mill consumption is likely to continue to be entirely of its own cotton. Argentina, though its industry is relatively small, has been increasing its textile production to meet the needs of its own consumers.

Cotton Goods in World Trade

The United Kingdom sees little prospect that its exports of cotton products can rise above the level of 1936–37, when they were only about 30 percent of the 1913–14 average. It will enter the post-war period with its cotton industry handicapped by much obsolescent equipment. A large-scale modernization program is now under consideration, the realization of which will extend over a number of years. Seemingly, however, Britain will be more disposed to specialize in fine and fancy goods than to try to regain its former trade in the bulk-line goods of which the raw material is cotton of the American types. Canada has roughly doubled its pre-war consumption of raw cotton, and has approximately attained sufficiency for its domestic needs at about 500,000 bales, all of which must, of course, be imported.

The future of Japan, which before the war was rated the lowest cost large-scale producer of cotton goods for export, will depend to a large extent upon the role which that country is allowed to play when the war is finished. Japan's position as a cotton-goods exporter was enhanced in 1932 by the devaluation of the yen, but weakened perceptibly after 1937. Also, the loss of a substantial part of its silk trade with the United States in the 1930's and its efforts to import commodities needed in war preparations impaired Japan's ability to import raw cotton for the use of its own people, and stimulated the production in Japan of synthetic fibers. In the war years Japanese cotton mills have been partially dismantled, according to many reports, in a program designed to shift a substantial part of its cotton-textile industry to the Asiatic mainland. Under the most favorable

conditions, therefore, it might take Japan proper some time to recover to the level of 1937.

Chief uncertainties with regard to the continent of Europe are the extent of the destruction and disorganization of industry and the form which the economies of Germany and Italy will take in the post-war political reorganization. The Continent may again become a substantial user of raw cotton. Nevertheless, it would seem that the problem of exchange must continue to dictate a large use of synthetic substitutes.

Three Trends of Basic Importance

Three trends of basic importance, some of which have continued or have been accentuated during the war, have characterized the development of the synthetic-fiber industry. They are improvement of quality, cheapening of costs, and expansion of mill facilities. Quality improvement has increased the preference of consumers for synthetics in an ever-widening range of uses. Price reductions have intensified the competition of synthetics with the lower-priced fibers. The increase of mill capacity has removed former physical limitations to the volume of production. After largely displacing silk, the synthetics have come since to dispute the field of wool and cotton. The displacements have not been accurately calculated; but possibly 60 percent or more of all rayon production goes now into uses which otherwise cotton would normally serve. On that basis it could be computed that of the world's total rayon production, which now equals abut 8,000,000 bales of cotton a year, the actual displacement of cotton approaches 5,000,000 bales.

Moreover, in the large-scale cotton-importing countries the production of rayon permits large savings of foreign exchange. The usual source of the necessary cellulose is wood pulp. Normally, the wood pulp required for a pound of the finished rayon is obtainable at costs equivalent to no more than 4 or 5 cents, and often without any expenditure whatever of dollars or sterling or any other foreign exchange. Countries with well-developed chemical industries usually have nearly all of the other materials for rayon making available domestically, and consequently can pay for them in their own currencies. An additional advantage is that rayon production gives employment to the people of the country in the raw material as well as in its finished-product stage. By comparison with wood-pulp cost, cotton on a waste-free basis can seldom be had at less than twice the cost in terms of foreign exchange. In countries which can produce rayon and which at the same time must economize foreign exchange, the governments can force rayon into uses for which it is physically less suitable than are the natural fibers. Forced substitution of rayon for cotton actually occurred in Germany, Italy, and Japan in the late 1930's.

The United Kingdom has suffered a great loss of external sources of revenue. After the war it will need to economize foreign exchange. One way would be to favor rayon over cotton in the textile consumption of its people. In France, too, demands on the country's foreign funds may dictate a larger post-war production of synthetics.

Annual international trade in cotton of all kinds before the first World War was about 13,000,000 bales. The war materially reduced this figure, but by 1924–25 the trade had recovered, and for the next 15 years it tended to remain fairly stable at or near this level. This relative stability coincided with important increases in world cotton production and consumption. Hence it reflected the expansion of the cotton-textile industry which took place in cotton-growing countries. Through the 1920's the share of the United States in total world exports of cotton was about 60 percent. In the 1930's the American share declined. Simultaneously, cotton's share in the total of United States exports declined sharply. This was at a time when the share of agriculture in our export trade as a whole was rapidly declining.

While the United States has been at war, exports have shrunk to a meager figure. Shortage of ships has bound Canada's trade to this country, but exports otherwise have been restricted mainly to lend-lease deliveries.

Post-War World Trade in Raw Cotton

After the present war, if cotton manufacturing continues to increase to a greater extent in cotton-growing than in cotton-importing countries, we may have further increases in world cotton consumption but little if any increase in the total volume of international trade in raw cotton. Some increase might take place, however, if there should be a substantial improvement of living standards in populous countries as yet relatively undeveloped. Our share of the trade will in either case depend largely on the price at which American cotton can be offered in the world market and on the purchasing power other countries have in terms of United States dollars.

Cotton manufacturers in the importing countries generally prefer American cotton to other growths; but the premium they will pay seldom exceeds a fraction of a cent. When the price differences between American and competitive cottons of like quality are wide, it is difficult to sell American cotton in foreign countries so long as supplies of other cottons are abundant. Recent legislation has largely restored the competitive price position of American cotton in foreign markets by authorizing the Government to sell its holdings of surplus cotton for export at "world prices" while holding farm prices at parity. Programs under this legislation are now being worked out.

The Importance of Dollar Exchange

It would be difficult, however, to overestimate the importance of dollar purchasing power in the hands of foreign customers. Our relatively large cotton exports in the 1920's were made possible largely by the Dawes and Young plans, which involved loans of American dollars to Europe. But our experience with these loans was not happy. It suggests that more care will be exercised after this war in the extension of credits abroad. It suggests also that the more responsible foreign borrowers may be less inclined to incur direct obligations in dollars. Conceivably, European countries will import as much as

possible of raw materials from the less highly industrialized countries, which in turn will provide markets for Europe's exports of manufactures. The United Kingdom, for example, may show a stronger tendency to purchase cotton in countries within the sterling area, or in debtor countries. Developments of this kind, which could have a counterpart in Japan if Japan again attains importance as a cotton manufacturer, obviously will not be advantageous to the American export trade.

A further possibility of considerable importance is that most of the cotton-importing countries of Europe may feel compelled during an extended period following the war to control the sources and volumes of their imports while their trade and financial structures are being rebuilt.

WHEAT DURING AND AFTER THE WAR

The war has increased the use of United States wheat tremendously from an annual average of 720,000,000 bushels for the period 1932–41 to nearly 1,300,000,000 bushels in 1943–44. Large quantities have been utilized for feed and industrial alcohol, and the food use has increased moderately. Production in 1943 was considerably below the large consumption in that year; carry-over stocks were reduced from about 600,000,000 bushels on July 1, 1943, to about half that quantity on July 1, 1944; and about 135,000,000 bushels was imported. The large crop of 1944, however, is expected to cover a continued large consumption without further reducing the carry-over.

If the acreage goal announced for 1945 is achieved and if the yields are average, a crop of about 850,000,000 bushels will be obtained. Wheat disappearance in 1945–46 will depend to a great extent on the progress of the war; but a crop of 850,000,000 bushels, together with a limited reduction in the carry-over, should cover the requirements. If the expected disappearance materializes, carry-over stocks July 1, 1946, may be reduced to about 300,000,000 bushels. It should be borne in mind, of course, that this quantity would exceed the 10-year prewar average of 245,000,000 bushels. On the other hand, such a carry-over, although greatly reduced from the 632,000,000 bushels in 1942, would be large enough to provide a sizable reserve against a year of small yields, which may be expected sometime soon, inasmuch as yields since 1939 have been above average.

Post-war domestic requirements for United States wheat will depend considerably on the quantity fed or used for industrial purposes. Before the war, when total domestic disappearance averaged about 675,000,000 bushels annually, about 115,000,000 bushels were used for animal feed, most of it on the farms where it was grown. Under a program which would provide cheaper wheat for feed than for food, the feeding of wheat to livestock could be increased. Before the war the quantity of wheat used for industrial purposes was negligible; the increase during the war years, which has been very large, suggests the possibility of some decline in post-war years.

The export outlook has two important aspects. One has to do with the probable volume of international trade in wheat. What this will

be depends on many things, notably on trade restrictions and the trade policy of wheat-importing countries. The other aspect turns on the price of wheat in the United States as compared with the export price in other countries. Five nations (Argentina, Australia, Canada, the United Kingdom, and the United States) have signed an international wheat agreement. It provides for an export quota for the United States of 16 percent of the combined exports provided in the agreement. Thus, if the combined export total should amount to 400,000,000 to 500,000,000 bushels, the United States share would range from 64,000,000 to 80,000,000 bushels. But our post-war share of the total exports will depend also on the method we adopt to meet competitive prices. In the 1920's, before European countries drastically restricted their wheat imports, our net exports of wheat, including flour, averaged slightly below 200,000,000 bushels. In the 1930's, with 3 drought years excluded, our net exports totaled annually about 75,000,000 bushels.

Income to United States Wheat Growers

Income to United States farmers from wheat sales in 1943 exceeded $825,000,000. In 1944 it may be about $1,450,000,000—the highest since 1919. The large income in 1943 chiefly reflected good prices; that of 1944 is the result of large production as well. Prices in these 2 years were doubled the average for the 1931–40 period. The Agricultural Adjustment Act of 1938, along with subsequent legislation, provides cooperating farmers with price-support loans at 90 percent of parity on wheat harvested before the expiration of the 2-year period beginning the first of January following the official proclamation that hostilities have ceased.

Two other measures that have a bearing on wheat prices are in effect. One is an offer by the War Food Administration to purchase unredeemed 1944 crop loan wheat at the end of the storage year at parity equivalent prices less all carrying charges. This arrangement carries out a mandatory provision of the Stabilization Extension Act of 1944 (Public 383, 78th Cong., approved June 30, 1944) that all lawful means shall be used to bring agricultural prices up to parity. The other measure is a provision of the Surplus Property Act (Public 457, 78th Cong., approved October 3, 1944) whereby the Commodity Credit Corporation may export wheat and flour at competitive world prices.

The supply situation in principal exporting countries indicates that the world surplus will still be large on July 1, 1945, though it declined in 1943–44. Combined stocks in Canada, Argentina, Australia, and the United States on July 1, 1944, are estimated to have been about 1,170 million bushels, as compared with a 1,750-million-bushel supply (the record) in 1943, and with the 1935–39 average of 457,000,000. Stocks in these four countries have been reduced in the past year by about 580,000,000 bushels.

This reduction, the greatest single year carry-over change on record, is the result in part of the 1943 decline in wheat production in the four countries, and in part of the wartime nonfood demand for wheat. Virtually all of the decline in 1943 production occurred in

North America. Argentina's stocks, though somewhat reduced, are still near the record level of 1943. Australia's stocks decreased moderately, as a result of a small harvest in 1943. Of the total stocks on July 1, 1944, in the four countries mentioned, about 700 million bushels will be available for export during 1944–45. In addition, there will be the surplus from the production in 1944.

WOOL AND WOOL PRICES

World wool production was already of record proportions when the war began. It was further stimulated in the early war years by relatively high wool prices and by the guarantee that the British Government would purchase the entire production of Australia, New Zealand, and South Africa for the war period and for 1 full clip year after the war ends. In the United States price preference for the use of domestic wool in Army fabrics and, later, Government purchase of the domestic clip at ceiling prices, encouraged production to some extent.

At the wartime peak, world production probably surpassed the pre-war (1934–38) average production by about 10 percent. In view of the indicated supply-and-demand situation, it seems unlikely that the high wartime level of production will be maintained in the early post-war years. Already there has been some indication of reduced production in Southern Hemisphere countries; in the United States production is about one-tenth below the peak of 1943. If prices should decline sharply when the war ends and the United States and British Government purchase programs are terminated, production may decline to or possibly slightly below the immediate pre-war level.

In many regions of the Southern Hemisphere, soil, climate, and transportation conditions are such that there is little competition from alternative agricultural enterprise and these conditions will act to check the liquidation of sheep, which would otherwise be expected as a result of a relatively low level of wool prices. Hence wool production will probably remain relatively large, even though below the wartime level.

Of far greater importance in the post-war supply situation is the fact that by the time the war ends the world carry-over of apparel wool may be possibly three times as large as the 1934–38 average carry-over, and about 60 percent larger than the world production of such wool. Furthermore, stocks may increase further for another year or two until wool consumption recovers. Never before have world supplies approached present and prospective levels. Most of the stocks at the end of the war will be owned by the British and United States Governments as a result of the wartime purchase.

This large wool surplus has accumulated because Axis and Axis-controlled nations which in pre-war years consumed almost half of the world's wool, have been unable to obtain supplies from the Southern Hemisphere during the war. These countries normally import more than a billion pounds (grease basis) of wool annually, chiefly from Southern Hemisphere countries. Consumption of wool has increased sharply in the United States and Canada, and in some of the

Southern Hemisphere countries, but except in South America the increase has been used entirely for military needs. Consumption for civilian use actually has declined below the pre-war level. A shortage of wool clothing and blankets has developed among civilians in many countries. The shortage is particularly great in the Axis-controlled areas where the production of wool is small and where the wool industry and ultimate consumers have been deprived of imports for as long as 4 or 5 years.

Possible Wool Consumption After the War

Restricting wartime consumption in order to build up stocks and conserve manpower, together with large savings of the civilian population in the United States and some of the other United Nations, should greatly stimulate consumption in those countries in the early post-war period. The United Kingdom will undoubtedly make every effort to restore her large export trade in wool manufactures, which has been sharply curtailed during the war years. In the Axis and Axis-controlled areas large quantities of wool will be needed just to build up stocks in distributing channels and in mills. Resumption of textile activity in these countries will be hindered by lack of purchasing power and by the need for replacing and reconditioning wool textile machinery. As most wool supplies must be imported, the problem of exchange may dictate a considerable use of synthetic fibers which can be produced from domestic supplies of wood pulp. The climate in many European countries is such, however, that wool clothing is likely to be the first choice of much of the population. Wool supplies can be obtained in large part from the less highly industrialized countries of the Southern Hemisphere where foreign exchange credit can be built up through sales of manufactured goods.

Even with especially high United States consumption and with a reasonably quick recovery to a comparatively high level of consumption in foreign countries and some decline in estimated world production, it probably will be some years before the increase in world stocks of possibly 3,000,000,000 pounds over the pre-war level will be used up. Meanwhile these large stocks could seriously depress world wool prices and hence domestic wool prices.

The United States is on an import basis for raw wool. In general, changes in domestic wool prices follow changes in foreign wool prices quite closely although domestic prices are maintained at a considerably higher level than foreign prices by the duty of 34 cents a pound clean content on most imports of apparel wool. As the British and United States Governments will own by far the larger part of world carry-over stocks of wool the policies of these Governments with respect to the disposition of their holdings will be determining factors in the post-war situation.

The post-war price problem for the United States grower is further complicated by the fact that prices of domestic wool have increased much more during the war period than prices in other important wool-producing countries and are now considerably higher than prices of duty-paid imported wools. Because of this price relationship,

which is being maintained by Government purchase and sale of the domestic clip at ceiling prices, mills are using little domestic wool except in military fabrics. Some means must be found for removing this price disparity before normal competition between domestic and duty-paid foreign wools in the domestic market can be restored.

ACHIEVEMENTS AND DIFFICULTIES IN LIVESTOCK PRODUCTION

Production of livestock and poultry products in 1944 will be about 40 percent larger than the average production during the 5 years (1935–39) that immediately preceded the war. The largest increases over the pre-war level have occurred in pork, eggs, and poultry. This record production has been encouraged by favorable price relationships, by the record feed output we had in 1942 and 1943, by the reserve of feed which was on hand in the Ever-Normal-Granary when the war started, and recently by imports of feed grains, particularly wheat, from Canada.

As early as 1941, the Department asked farmers to expand their output of livestock products in order to meet demands created by the world conflict. In the subsequent war years, it continued to encourage livestock production. As the above facts show, farmers responded vigorously and made the livestock program a success. In recent months, however, some people have overlooked this result, because temporary surpluses of eggs have developed, and some hog markets have been glutted. Also, reports of local feed shortages have drawn attention away from the over-all success of the livestock effort. Actually, the record output of livestock products, which has been invaluable to our military forces, our allies, and our civilians, throws the attendant difficulties completely into the shade.

It should be remembered that in addition to fulfilling requirements of our military forces and our allies, the livestock industry has provided United States civilians with 10 to 15 percent more eggs and meats per capita than they consumed during the 5 years 1935–39. These supplies have helped to sustain and improve the national level of nutrition and also to stabilize food prices. The best preventive of runaway prices, of course, is adequate production.

The large element of uncertainty which results from the weather and from other natural factors makes it impossible to balance the output exactly with the needs. It is gratifying, therefore, that the wartime effort in the livestock industries has come close to matching the demands. It has resulted occasionally in temporary surpluses, as with eggs in the spring of 1944; but it is far better, especially in wartime, to have too many eggs than not enough. As things look now, it seems probable that the peak of our livestock production will coincide rather closely with the peak of the wartime demands. After the war ends in Europe, some reduction in livestock requirements may develop.

It will be necessary in 1945, however, to cut the livestock pattern to fit the feed supply. In other words, some readjustment downward will be in order. By the end of the current feeding year, carry-overs

of feed wil be back at pre-war levels. Small supplies of feed grains may be imported. Broadly, nevertheless, annual livestock production in the years ahead will have to be adjusted to annual feed supplies. It will be possible, unless we have bad weather, to maintain annual feed production and consequently annual livestock production at a level above that of the immediate pre-war period, should the demand and price situation call for such an output. Recent improvements in land management and crop production and in livestock production make this entirely feasible. In post-war years, of course, the demand will depend largely on the domestic level of industrial production and employment.

Changes in Livestock Numbers

On January 1, 1944, the number of grain-consuming animals on farms and ranches was at an all-time high. But numbers will be smaller on January 1, 1945. Most of the decline will be in hogs and poultry, although sheep and lamb numbers are expected to be slightly lower. There will be fewer horses and mules—a continuation of the downward trend in evidence over a number of years. A small increase is expected in the number of milk cows, largely offset by a small decrease in the number of other cattle.

The number of hogs on farms January 1, 1944, was an all-time record, though the hog population had increased sharply since 1940. But the 1944 spring pig crop was 24 percent smaller than the record 1943 spring crop, and the 1944 fall pig crop showed a reduction from that of 1943. Cattle numbers, which have been increasing since 1938, were estimated on January 1, 1944, at 82.2 million head of cattle and calves on farms, a new peak in the cattle cycle. Little further change is expected by January 1, 1945. The number of chickens on farms January 1, 1944, was likewise a new high record; but a substantial reduction in the number of chickens raised and heavy culling of older hens will result in a smaller number on next January 1.

Total meat production in 1944 may be about 25 billion pounds, dressed weight, the largest of record. Cattle and calf slaughter during the year will be materially greater than in 1943, and much larger than the high points in 1918, 1934, and 1942. Hog slaughter in 1944 may be about 100,000,000 head, also a new record. Sheep and lamb slaughter probably will be less than in 1943; there are fewer sheep on farms, and the lamb crop was smaller in the previous year.

Dairy and Feed-Crop Production

Total milk production on farms in 1944 may be about the same as in 1943. Returns to dairy farmers will be higher, as a result of slightly higher prices and larger dairy-production payments. Production of most manufactured dairy products, except butter, may exceed the 1943 volume. Production of creamery butter may be the lowest since 1928. The demand for dairy products has been far greater than available supplies; and price ceilings, set-aside orders, and rationing have been used to regulate distribution.

Feed crops were somewhat smaller in 1943 than in 1942. Feed requirements, on the other hand, were such that an unprecedented disappearance of feed resulted. Carry-over of feed grains, which declined in 1943, dropped in 1944 down to about the long-time average.

In 1944–45, however, the supply of feed grains may be slightly larger than average, though smaller than in 1943–44. The reductions that are taking place in livestock numbers will make the 1944–45 domestic supply of feed grains slightly larger per grain-consuming animal unit on farms than it was in 1943–44, and only about 5 percent less than the average for the 1938–42 period. Moreover, supplies may continue to be supplemented by imports of oats, barley, and feed wheat from Canada. But imports of wheat for livestock feed will probably be smaller than in the past year.

POULTRY AND EGGS

Production of poultry and eggs has expanded more during the war years than the production of any other major commodity group, with the exception of feed grains and meat animals. Even before Pearl Harbor this Department asked farmers and poultrymen to increase their output in order to increase the country's meat supply and to provide eggs for lend-lease shipments. Stimulated by favorable egg prices and relatively low feed costs, the poultry industry moved rapidly into full production.

It was apparent late in 1943 that egg production was expanding at a more rapid rate than was needed for civilian, military, and lend-lease shipments. This fact, along with the expectation of some shortage of feed grains for all purposes, led to the establishment of goals for 1944 for eggs at only a small increase above 1943 production and to an actual reduction for both chickens and turkeys. The War Food Administration announced these goals and gave wide publicity to them in the fall of 1943; also, in cooperation with State extension services, it launched an extensive culling program, advised farmers generally to dispose of their poorer layers, and asked them to conserve their feed supplies.

Extremely mild weather last winter, however, was highly favorable to egg production. Hence, in spite of the change in the goals and of the developing tight feed-supply situation, supplies of eggs continued to accumulate faster than they could be handled effectively. Meat rationing caused increased domestic use of eggs and poultry, and large quantities of eggs went into military and lend-lease use. These demands absorbed a considerable part of the increased production. On the other hand, such factors as overburdened transportation facilities, lack of suitable containers, shortages of labor, and especially shortages of refrigeration space, greatly hampered the movements of eggs through distribution and marketing channels. There was some backing-up of eggs on the farms and in procurement and distribution channels, accompanied by a lowering of prices below the producer level which the War Food Administration had undertaken to support.

This whole situation first became critical in December of 1943. The War Food Administration immediately supplemented its various price-support programs and put additional programs into effect as a

means of retarding the decline in egg prices. For example, it began buying eggs at once for the 1944 dried-egg program for lend-lease shipment, in order to create an immediate demand for ungraded "yard run" or "current receipt" eggs in the Midwestern States. Under the original plan, this buying program would not have been started until early in 1944. In addition, War Food Administration started a carlot-purchase program for wholesale, consumer, and procurement grades of shell eggs in the North Atlantic States and soon afterward extended this program throughout the country.

With the coming of spring egg production, however, the supply continued to increase, and the pressure on storage space and on containers became still more critical. Farm egg production in April and May, the normal peak months, reached an all-time high. Offerings of "current receipt" eggs became particularly plentiful, first in the Southwestern States and later throughout the county. "Current receipt" eggs became available in larger quantities than the trade and egg driers could use or store. Accordingly the War Food Administration broadened its purchase to include this type of ungraded egg, at first in Texas and later in all other States.

Eggs are among the so-called Steagall commodities; in other words, eggs belong to the group of commodities for which an expansion of production for war purposes has been requested by public announcement to that effect under the provisions of the so-called Steagall amendment (55 Stat. 498, 1941; 56 Stat. 768, 1942). The amendment directs that the Steagall commodities must be supported at not less than 90 percent of parity. In line with this directive, War Food Administration in the spring and early summer months of 1944 purchased approximately 5.5 million cases of shell eggs for price-support purposes. This buying was in addition to War Food Administration egg buying for lend-lease.

Purchases of dried whole eggs for lend-lease in 1944 will probably approximate 250,000,000 pounds, or the equivalent of 25,000,000 cases. The 1944 requirements of eggs both in the shell and in the dried form for the armed services amount to an equivalent of 17.5 million cases. Altogether, in 1944 it is expected that total governmental purchases of eggs will amount to approximately 48,000,000 cases, or about 30 percent of the total estimated production.

Poultry Marketing Under War Conditions

Marketing difficulties with poultry have been much less serious. The scarcity of red meats has brought about a ready civilian market for poultry. In addition, the armed forces have taken large quantities of chickens and also turkeys both for military camps in the United States and for use abroad. In consequence, producer prices for poultry have held on the average very close to the ceilings. War Food Administration has been carefully watching the marketing of poultry, however, in order to be ready with remedial measures should the supply overtax processing facilities.

When egg prices declined last spring, farmers sharply curtailed their purchases of baby chicks. It seems likely that by January 1, 1945, total hen numbers in the country will be several percent smaller than

on January 1, 1944. This means that the poultry industry has already begun readjusting its production downward; it can be expected to provide fully for continued military and lend-lease requirements and at the same time make a gradual approach to peacetime levels.

TOBACCO

Tobacco has continued to hold high rank as a wartime commodity. Total use of leaf tobacco by United States manufacturers in the 1943–44 marketing year exceeded the previous record quantity for 1942–43 by 5 percent. It exceeded the average for the period 1935–39 by 48 percent.

The record disappearance through domestic manufacturers' channels, plus substantial quantities of tobacco furnished our fighting allies and friendly nations, drew moderately heavily on available supplies. Nevertheless, with increases of acreage in 1944 which resulted in the second largest crop in our history, tobacco supplies are being maintained at reasonable levels, in view of the tremendous wartime demand for food, feed, fiber, and oil crops.

Marked shifts have taken place in the utilization of American tobacco products. In these shifts the availability of tobacco stocks has been a comparatively unimportant factor. The major factors have been consumer preferences for the various tobacco products and the ability of manufacturers to obtain labor and materials for packaging. Purchases for the armed forces during the year constituted about one-fifth of the cigarettes and one-eighth of the cigars manufactured.

Among civilians the use of chewing tobacco continued to increase; smoking tobacco showed a further decline; and cigarette consumption, which recently has accounted for approximately three-fourths of the total domestic use of tobacco products, failed to increase during the first half of 1944 for the first time in many years. Consumption of cigars showed a net decline, which reflected a decrease of some 40 percent in the number of cigars retailed at not more than 6 cents each, that was offset substantially by a doubling of the number sold at higher prices.

Flue-cured and burley cigarette-type tobaccos, which represent about four-fifths of the total United States tobacco production for 1944, are subject to marketing quotas as a result of special congressional action and referendum votes of growers. These quotas will remain in effect for 3 years, beginning with the 1944 crops. Farm-acreage allotments were increased 20 percent in 1944 over 1943 to meet increased wartime demands. Marketing quotas have not been in effect for any other kind of tobacco since 1942.

Because the demand for most types of tobacco exceeded production in 1943, price ceilings were placed on flue-cured, burley, Maryland, and all continental cigar leaf types. These ceilings, imposed to prevent run-away and inflationary prices, were nevertheless high enough to reflect returns to growers substantially above those of prewar years. The War Food Administration allocated available supplies of 1943 crops of burley and flue-cured tobacco to buyers, in order

to distribute the leaf as equitably as possible among claimants. An international allocation, through the machinery of the Combined Food Board, largely regulated the overseas movement of 1943 crop flue-cured tobacco. The Commodity Credit Corporation handled most of the share for the United Kingdom and its dominions and colonies. Approximately two-thirds of the requirements of the British were sold to them for cash; the remainder, earmarked strictly for military requirements, was delivered under lend-lease. Some small purchases through regular commercial channels increased the movement of United States tobacco to our allies and to neutral nations.

Byproduct diversion programs, like those used before the war to reduce surpluses of dark tobacco and to support prices to growers, helped this year to meet the demand for insecticides, foreign supplies of which have greatly declined. Nicotine sulfate, obtained from leaf tobacco, has materially supplemented other insecticides, and has been of great value not only to the United States but to many of our allies.

In Jeopardy When War Began

When war began, probably no group of American farmers were in more serious jeopardy from it than the growers of flue-cured and dark tobacco. This country had been exporting more than half of its flue-cured and dark tobacco. The shock of the disruption has been partially relieved, particularly in the case of flue-cured tobacco. Easier shipping conditions, lend-lease arrangements, and the willingness of the British to use dollar exchange to purchase American tobacco for their civilians have been mitigating factors. We have furnished a substantial amount of the tobacco required by our allies, and in consequence should be in a preferred trading position when the war ends. Blends of British tobacco products have continued to include a large proportion of United States tobacco. Consumers who are in the habit of using particular types of leaf tend to keep on demanding them. On the other hand, our exports of the dark types of tobacco have been low during the war period, because their chief outlets previously had been in continental Europe and Africa.

The demand for tobacco is likely to be large in the period immediately following the close of hostilities. Most countries will need to replenish their inventories. What share the United States will have in this restocking will depend largely on the policies of the several nations, and on problems of exchange in the post-war period. When the restocking period is over, our international trade in tobacco will depend on various additional factors, such as expansion in importing countries of tobacco production of types similar to those grown here, the development of import duties and other trade barriers, and the willingness of American farmers to grow tobacco for export. Heretofore, the United Kingdom has been our largest single export outlet for tobacco, but important quantities have gone to other countries. Necessarily, the export situation will strongly influence our tobacco growing and manufacturing.

Post-war consumption of tobacco products in the United States cannot be foretold. Undoubtedly, however, it will continue to reflect

such factors as the preferences of consumers for various forms of consumption, the prices of different tobacco products, and the level of consumer incomes. The relative balance in the use of cigars, cigarettes, smoking tobacco for pipes and for hand-rolled cigarettes, and chewing tobacco will of course vitally influence the production of the several types of tobacco.

SUGAR

In 1944 the problem of meeting the sugar requirements of the United States and of its allies was complicated by the industrial alcohol program. There was a tremendous need for industrial alcohol, particularly for the great synthetic rubber program. It was necessary, because of the 1943–44 shortage of grain and because of the inability of other sources to furnish raw material in adequate quantities, to divert a considerable quantity of Cuban sugarcane into invert molasses. This diversion absorbed the equivalent of about 900 thousand tons of sugar. If it had not been possible for the alcohol program to obtain some of its raw material in this way from the sugarcane fields, we would have had to make further inroads into our grain supplies at a time when farmers were having great difficulty in feeding their livestock. Food was lost in the form of sugar because of the alcohol requirements; but this use of sugar made it possible to save food in the form of meat. The huge 1944 wheat crop, however, will probably make it unnecessary to divert sugar into alcohol in 1945.

Sugar supplies in the area controlled by the United Nations will probably continue to be scarce as long as the war in Asia continues. On the other hand, the demand will continue to be considerably above peacetime levels. It should be borne in mind, too, that the war in the Pacific has cut off our rubber imports from the Far East as well as our imports of sugar from the Philippine Islands and Java. Thus it has reduced the supply of sugar available to the United States. At the same time the need for sugar here has increased since, as already mentioned, we have had to depend considerably on high-test molasses as raw material for industrial alcohol. Even the end of the war in Europe will not immediately change the situation greatly.

Long-Run Sugar Problem

It may be necessary for some time after the fighting stops in Europe to ship considerable amounts of sugar abroad. But this applies only to the immediate post-war period. In the longer post-war period, the sugar-supply situation will undoubtedly change considerably. The return of sugar-producing areas everywhere to sugar production may bring back surplus conditions, unless sugar consumption increases greatly throughout the world or unless an international agreement or some other method results in sugar-crop curtailment programs. The areas that supply sugar to the United States normally can furnish considerably more sugar than this market is able to absorb at prices fair to both producers and consumers.

Such a surplus situation developed after World War I and continued in the years between the wars. It led to the adoption by this country of the sugar-quota system which was started under the Jones-Costigan Act of 1934 and continued under the Sugar Act of 1937. This system remained in force, with a brief lapse following the outbreak of the war in 1939, until the President suspended it by Executive order on April 13, 1942, upon recommendation of the Secretary of Agriculture.

In recent years all but a negligible part of our sugar has come from sugar-beet and sugarcane areas in the United States and from Hawaii, Puerto Rico, the Philippines, and Cuba. If we estimate the potential total production of these areas on the basis of the best crop each of them has had in the last 12 years, we get a total of about 12 million tons. This country's annual sugar consumption in the immediate prewar years averaged less than 7,000,000 tons. Local consumption in the islands and exports to other countries (practically all from Cuba) averaged somewhat more than 1,000,000 tons. The most important contribution to this potential 12 million tons is the Cuban production. The Cuban crop in 1944 was equivalent to 5,652,000 tons and was the third largest crop in Cuba's history.

Rubber policy in the United States and in the other United Nations may have a considerable effect after the war on the welfare of certain areas, notably Cuba, from which we obtain sugar. If this country maintains a large synthetic-rubber industry, and if for price or other reasons this rubber industry depends primarily on invert and blackstrap molasses, Cuba may not have to reduce sugar production to the 3,000,000-ton average of the 12 years that preceded the outbreak of the war. But this would mean difficulties in the Far East, which would probably want to regain its market here for natural rubber. This is just one of the difficult commodity problems that will have to be dealt with in post-war councils.

FRUITS AND VEGETABLES

Large crops of fruits and vegetables, the result partly of growers' responses to the Government's appeal for increased production and partly of favorable growing and harvesting conditions, helped greatly this year to meet wartime food requirements, which were greater than ever before.

Prices received by farmers for fresh fruits, although about the same during the second half of the year as a year earlier, averaged substantially higher for the entire season than in recent years. Prices for fresh market vegetables averaged substantially higher than in any recent year with the exception of 1943, when they reached the highest levels on record. Cash income to growers, this year compared with last, was substantially higher from fruits and truck crops; moderately lower from potatoes, sweetpotatoes, dry edible beans, and dry field peas.

As in the preceding war years, war conditions, problems, and programs greatly influenced the production, consumption, and prices of fruits and vegetables. Production goals were established again to

insure the desired quantities, with allowance for the fact that the production of most fruits is largely determined by past plantings. The Government announced support price and loan programs early in the season, in order to encourage growers to plant the required acreages. These programs were at levels of price and value generally as high as or higher than those of the preceding season. Growers responded well, despite the difficulty of getting labor, materials, containers, and other supplies.

Production of fresh market vegetables was larger than in 1943; in fact, it exceeded by one-tenth the previous record production of 1942. Production of truck crops for processing likewise was larger than in 1943, and production of sweetpotatoes was nearly as large. On the other hand, the output of potatoes, dry beans, and dry peas was considerably smaller. The crop of deciduous fruit was about one-fifth larger than the short 1943 crop. The 1944–45 crop of citrus fruit is expected fully to equal the record large crop of 1943–44.

Set-Aside Orders

It has been necessary, because of expanded military and other nonciviliian requirements, to set aside increased percentages of this season's packs of canned fruits and vegetables for Government disposition. The War Food Administration has issued set-aside orders for the entire crop of raisin variety grapes and for substantial portions of other fruit and vegetable crops. In many cases this has meant smaller per capita supplies for civilians, particularly of canned fruits and vegetables and of dried fruits. Civilians' supplies of most processed fruits and vegetables were short from the 1943 crops, in relation to consumer buying power. Hence rationing and price control had to be continued.

As the season advanced, however, the outlook for fruits and vegetables improved, and many fruits and vegetables were removed from rationing. Price control, however, was continued on most items for which maximum price regulations had been in force for the 1943 crops, and was extended to include most other fruit and vegetable items, as part of the general policy of preventing excessive rises in the cost of living.

The fruit and vegetable industries are now operating at record high levels of production and prices. With the return of peace, large decreases in Government requirements and at least temporary declines in civilian demand may reasonably be expected. This is likely to result in excess supplies of some fruits and vegetables, both fresh and processed, and consequently in lower prices. Rationing and price control will then no longer be required. The tree-fruit industries, which cannot quickly contract their production to meet declines in the demand, will face lower prices, especially for citrus fruit. Vegetable growers, of course, can more quickly adjust their output to new price and demand levels. But if consumer purchasing power can be well maintained, moderately high levels of production and price appear likely for fruits and vegetables.

FATS AND OILS

The United Nations realized early in 1942 that their supply of fats and oils would become inadequate for their wartime requirements and began to stimulate greater fats and oils production. The United States, as a result of its own expansion efforts, has changed from a net importer of fats and oils to a net exporter. It is recognized that in the post-war period. readjustments will be necesary in American production of vegetable oilseeds and animal fats.

Before the present war began, the United States was importing from 1½ to 2½ billion pounds of fats and oils annually. The imports consisted primarily of copra from the Philippines, palm oil from the Netherlands Indies, flaxseed from Argentina, and tung oil from China. After Pearl Harbor and the loss of the Philippines and the Netherlands Indies, the imports dropped, while the demand increased. Many industrial plants required increased quantities of certain oils to meet the war needs; the direct requirements of the Army and Navy increased substantially; and lend-lease needs became very large. Total United States requirements, including requirements for export, increased from about 10 billion pounds in 1939 to approximately 12 billion pounds annually during the war period. Thus the United States and its allies faced a shortage of fats and oils.

Asked by the War Food Administration to increase their output of these products and aided by price guarantees, American farmers responded well. Production of oils and fats in 1944 reached an all-time high of more than 11 billion pounds, 35 percent or about 3,000,000,000 pounds above that of 1939. Production of vegetable oils from domestically grown seeds (principally cottonseed, soybeans, flaxseed, and peanuts) was 75 percent greater than in 1939. Output of lard this year will exceed all previous records, and total animal-fat production will be about 25 percent greater than in 1939. Other countries which temporarily could not get fats and oils from the Pacific area undertook likewise to increase their production. The United Nations actively encouraged greater production of fats and oils in countries to which they had access.

Many countries have been expanding their production of fats and oils. In Canada, for example, the production of lard and flaxseed is far greater than in 1939; in fact, Canada has become a net exporter of both commodities. Mexico formerly imported large quantities of Philippine copra. Under the stimulus of the war it has produced sesame, peanuts, flaxseed, cottonseed, and other oil-bearing crops in greatly increased quantities. Several countries in South America have expanded their production of oilseeds. Argentina has particularly expanded its production of edible vegetable oilseeds. In 1936, when imports of olive oil from Spain fell off, the Argentine Government started to encourage domestic oilseed production, with the result that by 1944 Argentina had more than 400,000,000 pounds of edible oil available for export. As recently as 1935 it had been a heavy net importer of edible oils. Moreover, Argentina has increased its lard exports. Up to 1939 lard exports of Argentina averaged less than 20,000,000 pounds annually. This year it will have more than 100,-

000,000 pounds available for export. Brazil has increased its production of castor-beans and peanuts. Chile, formerly an importer of fats and oils, has increased its production of sunflower seeds.

Post-War Demands and Adjustments

Immediately following the cessation of hostilities in Europe, the demand for fats and oils is expected to be large. Continental Europe, excluding Russia, is the world's largest fats and oils consuming and importing area. Pre-war consumption of both edible and inedible fats and oils amounted to about 14 billion pounds annually, of which about 4 billion was imported. In the war years Europe's production of animal fats, which formerly accounted for about two-thirds of the total, was reduced owing to a shortage of livestock feeds. On the other hand, a substantial increase has occurred in the production of vegetable oilseeds.

In the pre-war years the world's import trade in fats and oils, including whale oil, amounted to about 10 billion pounds annually. About one-third of this total originated in areas now under Japanese control: Namely, the Philippines, The Netherlands Indies, Malaya, China, and Manchuria. With the liberation of European countries, and with these Far Eastern sources still cut off, the demand will be large and the competition keen for available supplies.

Allocation agreements are now in effect among the United States, the United Kingdom, and Canada. These agreements are operative through the Combined Food Board, in defined areas of purchase, and supplies are allocated to the various countries comprising the United Nations.

The export demand for United States supplies of fats and oils during 1945 should be sufficient to absorb any domestic surplus. Moreover, our imports of fats and oils are likely to continue on a restricted basis, but as soon as total world production becomes available, the world price level should begin to decline. Then the position of the United States will be one of serious concern, as our current production is in excess of normal domestic demands for the edible types of fats and oils that we produce.

In the United States the increase in oil crops during the war years has been in soybeans, flaxseed, and peanuts. In 1939 we produced 90,000,000 bushels of soybeans. Now we are producing nearly 200,000,000 bushels a year. We may ship several million bushels of soybeans to Europe in the immediate post-war years; but in the longer run we shall probably consume most of the soybean products at home.

Flaxseed production in the United States during the 5 years 1940–44 has been the largest in our history. At the same time, world production of flaxseed has been at a high level. The world crop in 1943 exceeded 200,000,000 bushels, the largest on record. World consumption has been at a high level. However, a large quantity has been used for fuel in Argentina. When Argentina is able to get coal and petroleum again, increased supplies of Argentine flaxseed will be available for export.

Expected Post-War Influences

The volume of United States lard that will be required during the post-war period, both for domestic consumption and for export, will depend upon several factors, such as the tariff, world trade policies, and competition from other exporting countries. The United States had a large export market for a few years following the last war and it is possible this market will again be available in the immediate post-war years. It is recalled, however, that in the 1930's the export, as well as the domestic demand for lard, was on the decline. Whether this trend will be reversed after the war-relief needs have subsided is of considerable importance to American agriculture.

Tung oil is another commodity, world production of which is expanding rapidly. The number of tung trees in China has increased materially during the past decade and several new developments are taking place in South American countries. Our consumption of tung oil may be expected to expand if prices are reasonable in comparison with those of other fast-drying oils.

In fact, many uncertain conditions lie ahead and make it difficult to forecast the kind of production adjustments that may be necessary in this country. One thing seems likely. When normal world production again becomes available, it appears that supplies will be ample to meet world requirements. For the United States, future tariff policies will determine the quantities of oils imported from abroad. Also, our trade policies with foreign countries may have a considerable bearing upon the extent to which other countries purchase our agricultural products.

THE EXTENSION SERVICES IN THE WAR EFFORT

Complicated farm problems can often be solved or made less serious through the mass application of relatively simple methods. As the educational link between agricultural research and farm practice, and consequently a means whereby new and better methods become widely known, extension work has helped to revolutionize farming in the United States.

Operating under cooperative agreements between the Department of Agriculture and the land-grant colleges, extension work has provided educational leadership for 30 years. It has encouraged the adoption, by millions of farmers, of practices that have improved the Nation's farm output and raised standards of living on the farm.

Recruiting of Farm Workers

As in 1943, the Extension Service had responsibility for local recruiting of farm workers and placing of all farm labor. The big job was to find emergency help during the season when farmers have always needed extra workers.

In most of the counties the county agent's office served as the clearinghouse, and farmers looked to him for additional labor. Town and city people, many of whom had never done farm work before, responded in substantial numbers to appeals to assist with the harvest-

ing of vital food and fiber crops and other farm tasks. As a result, about 4,000,000 persons supplemented the regular farm work force in 1944, about 95 percent of them in the areas where they lived.

Farmers and their families worked longer hours than ever before and made better use of the total labor and machinery available. The Extension Service encouraged neighborhood cooperation as one means of offsetting the loss of farm workers who had entered the armed services or taken jobs in war industries.

Food Preservation in the Home

Early in 1944 a national conference on home food preservation was called cooperatively by the Extension Service, the Bureau of Human Nutrition and Home Economics, and other departmental agencies. Authorities in technical and research fields attended the conference, which served to outline a Nation-wide program to lessen waste in home food preservation and to encourage preservation of a larger civilian supply of fruits and vegetables for fall and winter use. Extension programs dealt with canning, freezing, dehydrating, brining, and storage. "Spoilage" clinics acquainted homemakers with common types of organisms that cause spoilage and aided them in preventing spoilage. A Nation-wide pressure-canner gage-testing program was organized in cooperation with schools, manufacturers, and gas and utility companies. Extension workers helped in planning farm and urban Victory gardens.

Emphasis was placed on the production and preservation of meat for the farm family's food supply. Estimates of the family's yearly meat needs and of the number of animals necessary to supply it helped farmers to avoid overstocking. Many farmers who had not previously produced and preserved meat for home use asked extension agents for information and direction in slaughtering, cutting, curing, freezing, and lard rendering. Over 5,000 frozen-food locker plants in 48 States were available to about 1½ million families, mostly farm families. These freezing facilities have been a great asset to the home food production and preservation programs sponsored by the Extension Service.

Improvement of Crops

Extension workers continued to urge introduction of better strains and varieties of pasture and field crops as a means of meeting wartime requirements for food and livestock feed. They drew attention to the results of past efforts along this line, notably the tremendous increase in hybrid corn acreage in the past 10 years. In 1933 only about 143,000 acres, or one-tenth of 1 percent of the total United States corn acreage, consisted of hybrid varieties. By 1943 an estimated 49,964,000 acres, or 51.6 percent of the total United States corn acreage, consisted of hybrid varieties. In the spring of 1944 a total of 2,700,000 bushels of hybrid-corn seed was available for planting in the important Corn Belt States. Extension work promotes use of improved strains and varieties through cooperation on the one hand with research agencies in plant breeding, and on the other hand, with farmers and crop-improvement associations.

Experimental work with oats provides another example of striking results from this procedure. New varieties of both winter and spring oats are revolutionizing oat production in the Corn Belt and the Southern States. For the first time the oat crop is becoming an important feed crop in the South. The Extension Service helps farmers meet pasture and forage crop production needs, in line with the increased need for feed; it assists them in meeting goals for oil crops, such as soybeans, flax, cottonseed, and peanuts. Certification programs for cotton and potatoes, greater use of crop rotations, better fertilization, and better crop management are important items in the extension program.

Animal Husbandry Programs

Animal husbandry programs stressed labor-saving equipment; the self-harvesting of crops; the greater use of self-feeders; efficiency in the use of feeds through properly balanced rations; segregation of animals of different ages and classes into separate groups; culling of breeding herds and flocks; maximum use of roughage; greater use of mineral and vitamin supplements to stimulate growth and thrift. Practical elimination of the cattle fever tick was accomplished in 1943 and further progress made in the control of brucellosis in cattle and swine through Federal-State regulatory cooperation and much educational work by extension agents. Enough anti-hog-cholera serum was dispensed in 1943 to vaccinate 70,000,000 hogs. Livestock-conservation programs in 30 or more other States aroused wide interest among farmers.

Noteworthy was an eight-point program carried on by the Dairy Industry Committee, a national organization, in cooperation with dairy husbandry experts of the extension service in each State and the Department of Agriculture. It sought to get the message of better dairying to all suppliers of the Dairy Industry Committee membership, which represents buyers of milk and cream. Nearly 2,000,000 copies of a "what and why" leaflet, prepared by the Department of Agriculture, were distributed to dairy farmers. They were supplemented by "how" leaflets prepared by State extension services. The publications reached practically every patron of every creamery, cheese factory, milk plant, receiving station, and condensory in the United States. The wartime dairy extension program aroused great interest among farmers in localities where dairying is as yet relatively undeveloped.

Aids to Fruit and Vegetable Growers

Extension specialists gave considerable help to commercial fruit and vegetable growers, especially in meeting production goals for fresh and processed vegetables, potatoes, sweetpotatoes, dry beans, and fruit crops. New practices recommended in fruit growing included: (1) Hormone spraying to prevent preharvest drop; (2) thinning fruit by use of a spray during bloom; (3) hand-pollination of apples to induce annual bearing. Extension projects on commercial and home storage

of fruits and vegetables proved immensely popular. Plant disease and insect control programs, maintained with disappearing or diminishing quantities of sprays, dusts, and seed treatment materials, called for emphasis on methods of economizing the scarce materials. Substitute materials and emergency methods developed by experts were introduced to farmers by the State extension services. In counties with large commercial acreages of vegetables, fruits, and cereal crops, insect and plant disease control work became one of the leading extension projects.

Rural Youth Accomplishments

The year 1943 was notable in rural youth accomplishments. Some 1,639,000 4–H Club members, organized by extension agents into 74,813 4–H Clubs represented in practically every agricultural county of the United States, and in Alaska, Hawaii, and Puerto Rico, contributed substantially to the production of food and other urgent wartime programs. With slogans such as "feed a fighter," the members produced and earned and bought war bonds. They raised more pigs and calves and hens than they had ever raised before and were leading Victory gardeners in their communities. They preserved fruits, vegetables, and other food, helped their parents in meeting farm war goals, gathered scrap, repaired farm machinery and household equipment, renovated clothes, and watched their own health and nutrition.

Commenting on the contribution of 4–H Club members to the war effort, the Director of War Mobilization said:

> Many forces combined to bring about the increased yields of 1942 and 1943, but when the story is written, it must be said that there was no greater contribution than that of the boys and girls—members of the 4–H Clubs. They had been trained for farm life and, like trained soldiers going into battle, they were an inspiration to the recruits and brought about our victories on the farms of the Nation.

Various Other Extension Jobs

Military and civilian requirements increased the demand for farm timber. Extension foresters organized programs to augment farm output of sawlogs, pulpwood, ship timber, veneer logs, boxing and crating materials, naval stores, black walnut for gunstocks, charcoal, fuel wood, and similar products. Extension foresters aided many farmers in the proper treatment of native nondurable timbers for fence posts. Tanbark and sumac from farm lands helped to relieve the shortage of materials used for the tanning of leather for shoes, aviation, and other military uses.

Extension workers aided cooperative groups in obtaining credit to increase their processing of farm products; on the other hand, they warned farmers against the danger of abnormal increases in farm real-estate values through overexpansion of credit for land buying. Another program established county farm advisory committees to advise veterans who may want to become established in farming. Extension economists helped to assemble information about production, conservation, and marketing facilities. Educational programs on

marketing helped to cope with container shortages and other problems. Other extension activities acquainted farmers with the principles and details of the national price-stabilization program.

The urgent need for higher grades of cotton to meet civilian needs and military requirements has called for better quality cotton. Accordingly, the Extension Service has undertaken to promote better harvesting, handling, and ginning. Ginning specialists do intensive educational work with cotton ginners in the principal cotton States and assist county agents in holding demonstrations of efficient methods of cotton harvesting and handling.

CROP INSURANCE

In 1938 the Congress authorized a venture designed to remove some of the risk in the production of crops. A program of crop insurance was inaugurated for wheat growers; 3 years later it was extended also to cotton. The financial results were not as good as originally anticipated, and the Congress in the summer of 1943 cut off all funds for it except for liquidation of the program. During the 5-year period about 2,000,000 wheat and cotton crops were insured, and indemnities for crop failure were paid on more than 600,000 crops.

Some of the problems encountered were: Adverse selection of risks; overinsurance where reliable and applicable records of production for the farm were not available; difficulty in segregating losses due to avoidable causes from losses due to unavoidable causes; and difficulty in obtaining uniform, aggressive, and yet conservative local administration in some 2,300 counties.

The principal features of the insurance plan, however, appeared to be sound. They included essentially "all risk" coverage, rather than coverage of only certain specific risks; and insurance against production risks through insurance of yield. Insurance of yields leads logically into a plan of insurance whereby indemnities and premiums are determined in units of the commodity.

A feature of the yield-insurance method is the fitting of insurance protection to the productivity of the insured farm through the establishment of a coverage based on a percentage of the average yield for that farm. This provision needs some modification to take care of cases where, because the crop is abandoned early, the financial loss to the insured is relatively small. Premium rates are based on crop-loss experience and vary widely because of the great difference in hazards of production.

The program was considered to be an experiment, but it did not amount to a fully adequate trial. Although much progress was made in improving the system, it has not yet been possible to make full use of the experience thus gained.

The Federal Crop Insurance Act has not been repealed. The discontinuance of the program has resulted simply from the withholding of funds for its administration. Legislation is now pending in the Congress which would revive the program on a more conservative basis and provide for trial insurance on additional crops in a limited number of counties. Because of farmers' need for protection against produc-

tion risks, crop insurance should have a permanent place in the future agriculture of this country, and consequently the Department is interested in developing a satisfactory workable program.

FARM SECURITY PROGRAM

The Farm Security Administration's program of assistance to low-income farmers has operated both in a period of severe depression and during record high war employment and demand. The effects of these opposite environments on the progress toward rehabilitation and family farm ownership throw light on opportunities for small farmers in the future.

During the depression, the Farm Security's effort looked mainly toward preventing the complete displacement of low-income farm families from the land. Subsistence came first; but as this goal was attained and general economic conditions improved, progress was made in pre-war years toward restoring families to a needed function in the agricultural system itself, either through rehabilitation or through farm ownership.

The war economy, however, suddenly multiplied consumer purchasing power and expanded agriculture's markets. The same aids that formerly had brought gradual and slow results began to put the small farmer on his feet in a year or two. Remarkable production increases for the wartime markets came from previously low-producing farms and farmers. Employment on many formerly underproductive farms rose to near the full-time level, living conditions of the families improved, their incomes and net worth mounted, and their repayments of FSA loans jumped beyond all expectations.

Two primary factors underlie the low-income farmer's problem. One of them consists of the land, the credit, the practical guidance, and the facilities for health, for living, and for participating in market outlets that are essential for successful family-type farming. The other is a sound and progressive economy in general, with employment maintained at high levels and purchasing power kept equal to the production of an efficiently operated agriculture.

Before the war the most substantial production gain of families served by the Farm Security Administration was in their production for home use. Their cash-crop production, though it increased, was secondary. By the end of 1943, however, their production for sale had jumped tremendously. For example, their cash marketings of livestock and livestock products in 1943 showed the following percentage increases over those of 1942, which had also been much larger than before: Hogs, 56 percent; cattle and calves, 43 percent; sheep, 30 percent; milk, 18 percent; chickens, 47 percent; and eggs, 32 percent.

Progress toward farm ownership under the Bankhead-Jones Farm Tenant Act was much more rapid. On March 31, 1943, borrowers who were buying farms under this program had repaid 148 percent of the amount that would have been due on the basis of equal annual payments over the 40-year loan period.

Repayments on rehabilitation loans also went up and surpassed all expectations. In 1941 FSA borrowers had repaid 78.3 percent of the

amount due on their loans. By June 30, 1944, repayments had risen to 89.2 percent. Most of the remaining delinquencies were those incurred in the depression years. Eventual repayment of rehabilitation loans had been estimated before the war at about 80 percent. Because of increased repayments during the last 2 years, it is evident that collections will substantially exceed the former estimate.

During the last 2 years the Farm Security Administration has collected more than the amounts loaned. In 1943–44 collections totaled $126,399,900, or $1.87 for every $1 of the $67,475,400 in additional loans made during that year.

The average net worth of borrowers on the FSA program in 1941 was $1,242, or 42½ percent greater than when they came on the program. By the end of the 1943 crop year, the average net worth of active borrowers was $2,301.

From 1935 to March 1, 1941, a total of 147,162 borrowers had paid their rehabilitation loans in full. By December 31, 1943, the number of paid-up rehabilitation borrowers totaled 315,705. Although the farm-purchase program was started only in 1937, and the loans run for a 40-year period, 658 borrowers had paid off in full by March 31, 1944. Most of these paid with income from farm earnings alone, or with the help of income from other sources, but the number also included a few families who sold their farms, mostly to the Government for military purposes, and used the proceeds to pay their loans.

The Showing Since 1935

Because of reduced funds and personnel, the Farm Security Administration has not been able during the war to reach as many new families in need of aid as it did before. Since 1935 it has assisted approximately 1,000,000 farm families. Most of these are either fully rehabilitated or are well on their way toward that goal and therefore will be better able to weather any future set-backs that may occur.

When rural rehabilitation became a part of the national farm program in 1935, about a million farm families were on relief, and many others were earning no more than a bare living. Although the prevailing rural distress reflected the consequences of dust bowls and floods, as well as the Nation-wide depression, the fundamental causes were deep-rooted. They included unstable markets, farms too small or too large, inadequate credit facilities, improper land uses, increasing competition from big commercial farms, land crowding, and unsatisfactory tenure conditions. The problems existed in all parts of the country, in good- as well as poor-land areas and called for FSA action in every agricultural State.

The rural rehabilitation program was simultaneously a means of reducing public-relief costs and of helping the families regain their self-reliance and earning power. It provided credit combined with on-the-farm assistance and advice in practical, modern farm and home management methods. It helped small farmers readjust their debts, develop group services for buying modern machinery and high-grade sires, obtain written farm leases for terms of years, and organize county-wide group health plans for medical and hospital care. The

Bankhead-Jones Farm Tenant Act of 1937 provided funds for loans to several thousand tenants every year to buy farms of their own.

War Encourages Production for Market

The war removed barriers that had previously confined many lower income farm families to subsistence types of farming. Notably, it eased the pressure of population on the land and at the same time increased the demand for farm products. As men left rural areas for military service and for industrial jobs, land began to need tenants rather than tenants to need land. Markets for greatly increased production resulted from full employment at home and the food needs of our Army, and also from the requirements of our allies. In consequence, small farmers could often get additional acreage to cultivate and were able to make fuller use of their labor, at a time when many larger operators were handicapped by labor shortages.

Moreover, FSA borrowers had the advice and guidance of county supervisors in converting their farming operations to war food needs. As a result they increased their output substantially and in doing so strengthened their financial position for the future, obtained more adequate equipment and livestock, and acquired valuable experience in commercial production. With better incomes, they obtained needed medical care, paid off some of their debts, and accumulated savings.

Many farm families in the low-income group, however, have not yet been started on the road to independence. They have been unable to get credit or other assistance they need to increase production, and many are still stranded on small, eroded, or hillside farms, no better off than they were before the war.

In the fall of 1942, when the country urgently needed farm manpower, the Department found in a survey that 2,500,000 farm families were underemployed; many of them were not earning an adequate living. These 2,500,000, however, included part-time farmers, farm people too old to do much work, and farm people able, if necessary, with land or credit already available to them, to increase their farm activities. With these groups deducted, about 750,000 remained who were in a position to make substantial production increases if they could get assistance similar to that provided by the FSA.

The Post-War Needs

After the war, agriculture will be called on to offer opportunities for returning veterans and others who want to farm. For example, a survey of 3,184 servicemen from North Dakota showed that 2,473 had left farming to enter the service and that 2,726 wanted to farm when they got home. Only 371 owned land, and only 808 owned farming equipment, while 1,735 wanted to buy land and 991 wanted to rent.

Past experience has shown that land in itself will not assure security and success in farming. The veteran or anyone else who farms needs land of sufficient acreage and fertility to provide for family living and farm-operating needs, and, if purchased on terms, for taxes, insurance, upkeep, and repayments. He will also need livestock, machinery, and

other equipment, and access to marketing facilities. His eventual success, however, will depend on an environment that is conducive to family-type operations in general.

THE DRAIN ON OUR FORESTS

In the 3 decades prior to the war our estimated total reserve of standing saw timber was reduced almost 40 percent. Drain on our forests continues in excess of the annual rate of timber growth. The Forest Service estimates that wartime drain (which includes losses due to fires, insects, disease, and other causes but the bulk of which is from timber cutting) has been almost 17 billion cubic feet a year. Current growth is estimated at about 11.2 billion cubic feet. Thus total current growth is only about two-thirds of current drain. For saw-timber sizes, current growth is not much more than half of current drain. Moreover, much of the drain is of high-quality old-growth timber, whereas much of the new growth is of greatly inferior quality.

A long-range estimate by the Forest Service places our post-war annual requirements for timber at 21.4 billion cubic feet. This estimate, which is conservative, puts the annual requirements for lumber at 30 billion board feet—less than current consumption and substantially below the annual figure of many of the pre-war years. Pulpwood requirements are placed at 25 million cords—somewhat above current consumption but not out of line with the rate at which pulpwood consumption in this country is increasing.

The estimate allows a margin of 3.8 billion cubic feet for new uses of wood, for export, and for a safety factor. Recent developments in wood technology, particularly in the field of chemical conversion and plastics, point to a demand for wood for many new uses. An enormous post-war foreign demand for wood may be expected, which will raise the question whether or not we should allow further depletion of our forest resources in order to help meet the needs for reconstruction abroad. Heavy export demands and development of new domestic wood-products industries might bring about a future demand for timber much greater than 21½ billion cubic feet, provided our forests could supply it.

To provide an annual timber growth of 21½ billion cubic feet will necessitate practically doubling the Nation's present annual growth. We shall have to stop further depletion of our productive timberlands and restore timber production on millions of acres that have been reduced to nonproductivity.

Orphaned Acres

Many examples of good forest practice show how forest lands can be kept in continuously productive condition. The publicly owned timber on our national forests has been so handled for 40 years. Though the timber cut from national forests has been trebled in the last 3 years, their long-term sustained-yield capacity is not being impaired. In some areas, farm-woods management has improved markedly, particularly where the Federal-State cooperative project

for farm-timber management and marketing assistance is now operating. Selective or other good logging practice is being adopted by many of the largest and most progressive industrial owners of timberland; "tree farm" pledges by timberland owners under sponsorship of lumber trade associations are reported to cover some 9,000,000 acres of private forest land.

Nevertheless the bulk of our 341,000,000 acres of privately owned commercial forest land are still "orphaned acres" on which little or no systematic attempt (other than fire protection on some of them) is being made to keep them permanently productive. By and large, these private lands are potentially the Nation's best timber-producing areas, to which we must look for a major share of our future timber supply.

This Department has suggested a regulatory plan which would set up national standards for cutting and other forest practices sufficient to prevent further depletion and keep forest lands in reasonably productive condition. The basic forestry principle is simple. As timber is cut, more timber must be grown. Essentially this should be the standard for handling commercial forest lands, and under the plan proposed it would be given Nation-wide application through national legislation. Management of forest lands under this principle calls for different methods in the various forest types and regions. Specific rules should therefore be developed locally, with the help of local advisory groups. Actual regulatory work might well be carried out by the individual States. The Department believes, however, that the national measure which sets up the standard should provide for sufficient Federal participation to insure Nation-wide adherence to these standards.

Private enterprise should be encouraged to go beyond keeping the forest lands in reasonably productive condition. It should be helped in various ways to practice maximum sustained-yield timberland management. Public cooperation in fire protection, extended to all forest lands, is one essential aid. More adequate protection is needed against destructive forest insects and diseases; also increased technical aid in forest management and wood utilization for timber owners and operators. Research in forest management, protection, and utilization, in timber-growing techniques, and in ways to develop new and better uses for forest products will increase the opportunities for profitable private timber growing.

Post-War Forest Work

During the past year, as during nearly every other recent year, floodwaters damaged croplands and industrial properties. Many streams which once ran clear are now thick with soil washed from ill-treated farm and forest lands and go into flood stage on slight provocation. Millions must be spent for levees and other works to keep the waters in the channels. These necessary defenses, however, do nothing to keep the waters from flooding. That must be done on the watersheds where the floods begin.

Measures which promote good forest and range management con-

tribute to water conservation and flood control. In many watershed areas, however, additional measures are necessary, such as upstream engineering and erosion-control work, reforestation of denuded timberland, and revegetation of worn-out ranges. Such work on these areas will, in turn, help to restore them to productivity in timber-growing or livestock grazing.

Other useful and needed work includes improvement and expansion of facilities for fire protection, fire-hazard reduction, reforestation, measures to improve timber growth, range improvement and reseeding, development of forest research and administrative facilities, development of new forest recreation facilities, and improvement of wildlife habitat and the carrying capacity of fishing streams. Also, such work offers opportunities for healthful, outdoor work which is noncompetitive with private industry. Forest-work programs can be expanded or contracted in accordance with the changes in the general employment situation. Regardless, however, of whether or not the post-war period brings unemployment, a substantial program of forest restoration and development should be undertaken when the war ends.

Forest rehabilitation and improvement could best be accomplished in certain areas if some of the lands were first acquired for public forests. These acquisitions would include forest lands on which the productivity is so low or the timber is in such rough or inaccessible country that the owners cannot be expected to have much interest in the long-term timber-growing possibilities. Some forest lands have been so denuded that they offer no prospect of income to the owner for many decades. Many of these lands are chronically tax-delinquent Such lands, together with certain other areas where acute problems of watershed protection or other important public interest exist, should be considered for public purchase and development as soon after the cessation of hostilities as possible, either for additions to our national-forest system or for State, county, or municipal forests.

Many veterans, war workers, and other persons are buying land with the idea of taking up farming after the war. Too often the land purchased is logged-off stump land which is ill-suited to farming and should be restored to forest. Necessary to the development of an economically successful farm, however, is the discouragement of attempts to farm obviously submarginal lands. Restoration and development of forest lands as forest lands will help in this respect since it will promote proper land utilization and obviate human suffering.

War Activities of the Forest Service

Lumber and pulpwood were critically needed war materials in 1944. In spite of extraordinary efforts to stimulate production, output of lumber was some 4 to 6 billion feet below consumption annually. Civilian consumption was cut, but essential requirements reduced stocks to a dangerously low level.

With thousands of small lumber mills idle or operating only part time, and with pulpwood cutting very low, the War Production Board enlisted the cooperation of the Forest Service in a program to stimulate increased production by helping operators and woodland owners to

maintain, recruit, and train their working forces, work out problems of equipment and transportation, and obtain adequate supplies of stumpage. The Forest Service functioned primarily as a coordinator; it supplemented the efforts of the timber owners and operators and enlisted the cooperation of the State forestry departments, extension foresters, and other agencies.

The timber production war project functioned in most of the States east of the Great Plains. It provided many examples of initiative and ingenuity in dealing with absenteeism, equipment break-downs, and other emergencies. Some 9,000 German and Italian prisoners of war were trained in woods work and employed in timber and pulpwood cutting, largely on private logging operations.

The project got under way about September 1, 1943. By June 30, 1944, it had resulted in the production of at least 1,150,000,000 board feet that would otherwise not have been produced. This estimate covers the measurable production only; hence it probably represents only about 60 percent of the total accomplishments, much of which consisted of services not translatable into specific quantities.

In January 1944, a severe sleet and ice storm damaged timber over large areas in eastern Texas and western Louisiana. Since this timber was urgently needed for war purposes, a Federal project known as the Texas Timber Salvage program was set up. Financed by the Disaster Loan Corporation and administered by the Forest Service as an agent of the Federal Surplus Commodities Corporation, the program undertook comprehensive salvage operations, which may be completed by April 1945. A substantial part of the damaged timber is being salvaged, worked into pulpwood and sawlogs, and sold to local industries.

National-Forest Timber and Range

Requirements for aircraft spruce passed their peak in 1944, and the Forest Service began to wind up its Alaska spruce log project. By the time the project is closed, approximately 40,000,000 board feet of high-grade Sitka spruce logs will have been delivered to Puget Sound mills. In addition, the project will have delivered some 45,000,000 feet of hemlock and low-grade spruce to Alaska mills for the use of the armed forces in the Territory.

Plans for a pulp- and paper-manufacturing enterprise in Alaska were considered by the Forest Service in the late 1920's. In the depression years of the 1930's, however, the whole matter was dropped. It is now being restudied in the light of changed conditions. Representatives of the pulp and paper industry feel that the post-war supply of raw material and the market situation will probably permit and justify the development of the industry in Alaska and have asked the Forest Service to analyze the possibilities. Accordingly, after preliminary studies, the Forest Service invited inspection by interested parties of a designated large timber tract in the southern part of the Tongass National Forest, and prepared a tentative draft of the conditions under which the timber may be offered for sale at the close of the war. The conditions will include provisions for sustained-yield management, continuous employment, and thoroughly modern industrial communities.

Enactment of the cooperative sustained-yield-units law of March 29, 1944 (Public, No. 273), will make possible the integration of timber-management planning for national forest and intermingled or adjoining private forest lands in a number of localities. This act authorizes the Secretary of Agriculture to enter into agreements with private owners for cooperative management of adjacent national-forest and private-forest lands in designated sustained-yield units. Under these agreements, the private owners will have the assured privilege of purchasing Government timber, and they in turn will manage their private holdings in accordance with requirements as to rate, manner, and time of cutting prescribed by the Secretary. Such action will facilitate the transition of the logging operations involved from a cut-out-and-get-out basis to a permanent basis, and will contribute to the security and stability of communities dependent upon continuing woods operations.

The present 10-year grazing term permit period ends in 1945. Early this year representatives of the livestock industry met with the Forest Service to discuss the policies to be applied during the new period opening in 1946. No major change will be made in the present policies regarding distribution of grazing-permit privileges. The Forest Service plans again to issue 10-year term permits, beginning with 1946, to all qualified users desiring them where range conditions justify a long-term permit. Stockmen generally welcome the term permit as a factor contributing to stability in the use of national-forest ranges.

Forest Research

The Forest Products Laboratory concentrated its work during the year on the research and technical services needed to further increase the utility and value of forest products in meeting war and essential civilian requirements.

In the past the major utility of wood has been for shelter and fuel. Progress in science, including many notable wartime developments, has greatly expanded the potentialities of wood as an industrial raw material for an increasingly wide range of uses. Continued research may be expected to create new industries and strengthen old ones.

Woods and mill wastes amount to from one-half to two-thirds of the Nation's total wood crop. One field for utilization of wood wastes lies in the fact that the cellulose of wood can be readily and cheaply converted to sugar. Through the ordinary process of fermentation, yields of industrial alcohol of from 50 to 60 gallons per ton of dry softwoods can be obtained, but after further research nearly 50 percent greater yields should be possible. Wood sugar may be converted also by other types of fermentations to any of the vast series of products potentially derivable from the interaction of micro-organisms and sugar. One important possibility is the conversion of wood sugar to high-protein stock feeds. With present techniques a cord of wood can be converted into one-third ton of high-protein feed, approximately equivalent in protein content to about 50 bushels of corn.

In the production of wood sugar, one-fourth of the wood by weight remains as lignin. The values inherent in this material may exceed

the values obtainable from the sugars themselves. Lignin, on a laboratory scale, has been made to yield valuable phenols and cresols and a whole series of potentially more valuable chemicals. Lignin is closely related to humus. It seems highly probable that by the proper combination of lignin with cheap nitrogen, methods can be developed for the utilization of lignin byproducts of wood hydrolysis as a fertilizer material carrying nitrogen in a properly available form and leaving a humus residue. Lignin produces conversion products useful in the making of plastics. There is a huge field here to be explored for cheaper plastics and valuable byproducts.

To provide a sound factual basis for the orderly development of forest enterprises in Alaska, the Forest Service hopes to initiate a program of research on the utilization and management of Alaskan forest resources. As yet the forest resources of Alaska are practically untouched. So far there has been no organized forest research in Alaska, and knowledge of what should be the most desirable silvicultural practices there is extremely limited. Forests are one of Alaska's major resources, and their wise use is of utmost concern to the region. Mistakes made during the early history of the United States must not be repeated in Alaska. Too often in the past, forest industries have been based upon the utilization of a single species or end product. There is danger in this, especially in Alaska, where the highly prized Sitka spruce comprises only a fifth of the total timber volume. It is essential to capture from the resource all of the products that the available species are capable of yielding through well-balanced utilization by diversified wood-using industries.

NUTRITION NEEDS AND AIDS IN THE UNITED STATES

Wartime demands on our food supply, together with wartime shortages of manpower and machinery for food production, have made it essential to look carefully at what is known about nutritional requirements of people, both in terms of nutrients and in terms of foods to supply them. Fortunately, despite gaps in our knowledge and conflicting evidence as to requirements, it has been possible, by agreement among investigators, to set up dietary goals which give reasonable assurance of meeting human needs. Much current research, therefore, considers the value of foods as sources of nutrients, methods of conserving their nutritive qualities, the extent to which one food can be substituted for another, and the ways in which different foods can supplement one another.

Studies are being made to show the trend in over-all nutritive value of our civilian food supply. In making this evaluation, the statisticians reckon domestic production and imports with adjustments for carry-overs, and deduct foods purchased for the armed services, lend-lease, and foods exported for other purposes. After allowing for waste in processing or marketing and for nonfood uses, they divide the net supply of each food item separately by the total number of civilians. This operation gives the per capita amount of a given food available. Then the nutrition experts translate pounds of flour, for

example, into calories, grams of protein, fat and carbohydrate, and so on through the essential minerals and vitamins. These nutrients plus those obtained from milk, meat, potatoes, and all the other foods that we consume in this country, are added together. The result is an average figure for the total number of calories and other nutrients available to civilians.

Many people, however, consume less and many consume more than this average. The average figures show the quantities of nutrients available to civilians at the retail store level. Moreover, after the housewife takes food home from the store, there may be further waste. Refuse such as orange skins, potato parings, and bone are accounted for in nutritionists' calculations, but not avoidable household waste, such as the throwing away of spoiled potatoes or the loss of nutrients through poor storing in the home or poor cooking.

In general, the studies show that the food our civilians had in 1943 provided more of every nutrient per capita than in 1935–39. For most nutrients, the over-all 1943 situation was better than that of 1941 though 1941 was a year of high food production, during which, moreover, there was no rationing and our armed services and lend-lease food needs were relatively small. Preliminary estimates for 1944 indicate no reduction from 1943. Much of our recent improvement in dietary levels can be traced to increased consumption of milk, citrus fruits, and green and yellow vegetables. Victory Gardens have increased the supply of vitamins A and C; enrichment of white flour and white bread has improved our dietary supply of several nutrients, notably thiamine.

Nevertheless, many persons still fail to get adequate diets. Among the causes are low income, lack of knowledge about nutrition, and indifference about food. Latest detailed information as to the way in which our national food supply is divided among economic groups is for the spring of 1942. It indicates that many families then had diets that were low in certain essentials, especially calcium and riboflavin, as compared with the dietary recommendations of the National Research Council.

Nutrition Programs in Use

Various programs are in effect to reduce the number of people living on unsatisfactory diets. Educational programs, such as those stimulated by the National Nutrition Conference in 1941, teach people not only to want better nutrition but how to attain it. The school-lunch program is providing better nutrition for approximately 3½ million children in 1943–44. It needs to be expanded, because a still larger number of children who have need of the program have not yet been reached by it. In-plant feeding of industrial workers has improved the nutritive quality of their diets. Rationing and price control are helping the low-income consumer to get a fairer share of the available food supply. All commercially made white bread and all white flour that is labeled "enriched," have a higher mineral and vitamin content than formerly.

Controlling the nutritive content of food sold on the retail markets is an extremely effective way of applying advances in nutrition

knowledge. Measures in operation include the addition of iodine to salt for the "goiter belt," the addition of vitamin D to milk, particularly for child feeding, and the addition of vitamin A to oleomargarine, as well as the enrichment of white bread and flour.

The latest and one of the most far-reaching of these measures is the enrichment of white bread and flour. Dietary surveys made in the 1930's indicated that many families in this country were eating food that did not provide them with the recommended quantities of calcium, thiamine, riboflavin, and probably niacin. One way of getting more of these nutrients to persons in need of them (such people were usually, although not always, in the low-income groups) appeared to be to put back some of the nutrients lost in the milling of white flour. In 1941, with the backing of the National Research Council's Food and Nutrition Board and of other groups, the Food and Drug Administration promulgated standards for the enrichment of white flour and issued standards for the enrichment of white bread.

Thereafter, if a miller or baker labeled a package of flour or a loaf of bread as "enriched" it had to come up to standards set for iron, thiamine, niacin, and later riboflavin. Large quantities of enriched bread and flour were sold in many parts of the country in the latter part of 1941 and during 1942. In January 1943 the first Food Distribution Order required that all commercially prepared white bread be enriched. Hence the enrichment of white bread is no longer optional but mandatory.

Types of Dietary Recommendations

Two types of dietary recommendations have been devised by Government nutritionists to influence food consumption for better nutrition. Both draw upon the same research, but they differ in scope and detail. The "Basic Seven" is a simple rule-of-thumb guide. It classes nutritionally important foods in seven major groups. Everyone should eat some food from each of these groups every day, along with other unlisted foods. The "Basic Seven" circle, divided into seven segments with foods or types of foods listed in each segment, has been widely publicized.

The second type of dietary recommendation calls for the use of a complete food budget. It suggests quantities of 11 food groups, proportioned so as to provide attractive meals that will meet all known nutritional needs. Charts or tables show the quantities required for persons in various age, sex, and physical-activity categories. From these a homemaker can pick out the amounts applicable to her family members, add them up and obtain a weekly food budget or market list. This guide to good nutrition can be used by farm families in making home production plans as well as by city families who must purchase all of their food.

Nutritional requirements in terms of calories, protein, minerals, and vitamins can be translated into many food patterns; the Department's family food plans provide both moderate-cost and low-cost versions. The low-cost version involves the use of relatively large quantities of

the cheaper foods such as grain products, dry beans, and potatoes. The moderate-cost plan includes relatively more meat and eggs and the more expensive vegetables and fruits. The most recent set of family food plans (1943) allows for rationing and wartime food conditions.

Guiding food habits toward good nutrition by means of the "Basic Seven," the low-cost or moderate-cost family food plans, or through other educational means calls for emphasis on the need for increased consumption of milk, citrus fruit, tomatoes, and green and yellow vegetables. If everyone in the United States obtained adequate diets patterned after the moderate-cost food plan, consumption would be increased in many lines. Something like a fifth more milk and citrus fruit and tomatoes, and twice as much green and yellow vegetables as were consumed in 1943, would be required.

Conservation of Nutrients

Conserving the nutritive qualities of food is important, since it is the quantities actually ingested that meet the body's needs. Research on this subject has expanded in the last 2 years in the Department's laboratories and at State experiment stations, through the organization of a national cooperative project. This research has shown, for example, that 80 percent or more of the ascorbic acid in vegetables may be lost by overcooking and discarding the cooking water. Through proper methods of cooking, loss of ascorbic acid may be kept to 30 percent or less, depending on the kind of vegetable. Losses of the water-soluble vitamins and minerals are greater for leafy vegetables than for roots, greater for peeled than for unpeeled foods, and greater for foods cut into small pieces than for foods cooked in large pieces. The vitamin A value of foods is relatively stable during cooking.

The conservation of vitamin values in commercially processed foods is of great significance. Freezing, canning, drying, and storing of processed food have effects important both for United States civilians and for consumers overseas. Rural families have always raised and preserved a considerable proportion of their food supply, and the Victory Garden movement has extended the practice to town and city. Much research is under way in the Department, at State experiment stations, and elsewhere to give both the commercial concern and the homemaker safe and sure methods of food preservation that will result in minimum loss of nutrients.

Studies are in progress with regard to the nutritional returns received in the form of important crops and livestock products from the use of labor, land, and other resources. These studies consider such problems as the number of calories and the quantities of protein, minerals, and vitamins that may be expected from an acre put, for example, to soybeans, as compared with the yield from an acre put to corn or other crops. Soybeans and other oilseed crops have been found to be outstanding in several respects. Nutrition science endorses wartime expansion in the production of these crops.

Addition of relatively small quantities of oilseed flours to patent wheat flour, cornmeal, oatmeal, and certain vegetable combinations, enhances their protein value. Nutritionally the protein value of a food

depends not only on the quantity but also on the kind of protein present. If a protein does not contain all of the nutritionally essential amino acids, it will not support growth or maintain an animal in a satisfactory state of health and nutrition, no matter how much of it the animal eats. The oilseed proteins are admirably suited to supplement the proteins of cereals, because many of the latter are poor in some amino acids that are abundantly present in soybeans, peanuts, and cottonseed. Thus, the use of these products offers one of the effective, economical, and practical ways of meeting the world shortage of protein foods. Soya flour and grits also contain vitamins of the B group in amounts similar to whole wheat. They may be used in a variety of ways in human foods.

Nutrition Values of Crop Varieties

Not only have studies been made of which crops to grow, but scientists have also been studying which variety to grow. The greater emphasis on cereals in wartime diets, for example, calls for more exact knowledge of the vitamin value of different varieties of wheat. The locality where it is grown makes a difference in the composition of the wheat berry. In this connection it is of interest to note one series of studies of the thiamine content of a number of varieties of Hard Red Winter wheat grown in different localities in the Great Plains. The wheats tested included Blackhull, Cheyenne, Chiefkan, Nebred, Tenmarq, Oro × Tenmarq, and Kawvale × Tenmarq. Each was grown in five localities, except Chiefkan, which was grown in four.

Tenmarq wheat from all the localities led the other varieties in thiamine content. The two Tenmarq crosses from all localities were also high in thiamine content, though neither equaled Tenmarq. The Nebred variety was a close second to Tenmarq. The actual content, however, has been found to vary with the locality in which the wheat was grown. Samples from Arkron, Colo., were richer in thiamine than those grown in four places in Nebraska or Kansas. More studies of this sort are needed.

Research shows, however, that caution should be used in recommending any one variety on the basis of its vitamin value as the variations may be due to differences in the way individual varieties respond to local growing conditions. In one small area one variety may be superior to another, whereas the reverse might be demonstrated in another place where different environmental conditions prevail. The wartime need for more reliable figures on the vitamin content of foods has stimulated research programs to study the causes of variations. Results to date have shown that natural variation in the vitamin content of food as harvested may be related not only to variety, but also to degree of maturity, climate, soil, and concentration in different parts of the plant.

Studies have also been made of the relative economy, nutritionwise, in the production of different vegetables and fruits. We get nearly all of our vitamin C and half of our vitamin A value along with important quantities of other vitamins and minerals from fruits and vegetables. But vegetables differ widely among themselves as sources of nutrients. For example, 100 hours put in on the raising of tomatoes may produce over twice as much ascorbic acid (vitamin C) as the

same amount of labor devoted to cucumbers, according to studies made in California. Or again, given a normal yield, 1 acre of average land planted to carrots may produce over a hundred times more vitamin A value than an acre planted to cucumbers.

NUTRITION SURVEY IN THE UNITED STATES, THE UNITED KINGDOM, AND CANADA

Heavy demands in 1942 and 1943 on the food resources of the United States and Canada, to meet military and civilian needs of the United Kingdom and of their other allies, drew attention to relative levels of food consumption in the three countries mentioned. No method had been worked out, however, for placing their data on a common basis. The Combined Food Board therefore created a fact-finding committee. It directed the committee to formulate a method of comparing food-consumption levels in different countries and to report on relative changes that had occurred during the war in the per capita civilian food-consumption levels of the United States, Canada, and the United Kingdom.

The committee held meetings in Washington, London, and Ottawa. Its report,[3] which the three Governments published simultaneously in April 1944, describes a method of making international comparisons worked out by the Committee, and assesses by that method the volume of food supplies that moved into civilian consumption in the United States, in Canada, and in the United Kingdom in 1940, 1941, 1942, and 1943, as compared with the volume in the pre-war period. The comparison is in terms both of commodities and of principal nutrients.

Before the war the over-all food-consumption positions of the three countries were very similar, although some differences existed with respect to particular nutrients and commodities. In 1943, by comparison with the pre-war years, the amount of food that moved into civilian consumption as measured in calories was slightly greater in Canada and in the United States, and 5 percent smaller in the United Kingdom. The United Kingdom showed large declines in meats, poultry, fish, butter, sugar, and fruits, but had marked increases in grain products, potatoes, vegetables, fluid milk, and cheese. In the United States and Canada the 1943 volume of supplies was smaller for some foods than before the war. For many other products, however, including meat, milk and milk products (excluding butter), eggs, tomatoes, and citrus fruit, it was greater than in the pre-war (1935–39) period.

Relative Positions of the Three Countries

The committee found that for all food groups, except grain products, potatoes, and vegetables, the level of supplies moving into civilian consumption in 1943 was highest for the United States. For Canada it was intermediate, though in most cases close to the United States level. It was lowest in the United Kingdom. For grain prod-

[3] COMBINED FOOD BOARD, SPECIAL JOINT COMMITTEE. FOOD CONSUMPTION LEVELS IN THE UNITED STATES, CANADA, AND THE UNITED KINGDOM. U. S. Department of Agriculture War Food Administration, 121 pp. 1944.

ucts and potatoes this order was reversed, with the United Kingdom having the highest level, Canada the next highest, and the United States the lowest. In leafy, green, and yellow vegetables, supplies were greater in the pre-war period in the United Kingdom than in Canada or the United States. They rose still higher relatively from 1940 through 1943. Canada's supplies of these vegetables, which had been below those of the United States and the United Kingdom before the war, continued in this position from 1940 through 1943. Supplies of the same products in the United States in 1942 and 1943 were about 10 percent higher than in 1935–39.

The fat content of civilian food supplies in the United Kingdom declined rather sharply during the war years, whereas in 1943 that of Canada was somewhat higher, and that of the United States about the same as during 1935–39. All three countries have had a slight decline in their supply of carbohydrates and an increase in their total supply of proteins. In the United Kingdom, however, the increase in the proteins is attributable to relatively larger supplies of vegetable protein, while in Canada and in the United States the proportion of animal protein is greater. All three countries are at least as well off as they were in 1935–39 in minerals and vitamins.

Each of the three countries in 1943 had (with certain exceptions) sufficient civilian food supplies if the supplies were distributed broadly in accordance with people's needs. In other words, they had food enough, with proper distribution, subject to the exceptions noted below, to meet the "recommended dietary allowances" of the United States National Research Council. Exceptions to be noted are as follows: Ascorbic acid in Canada, in the United States, and the United Kingdom; probably vitamin A in the United Kingdom; and possibly riboflavin and thiamine in all three countries. Loss of nutrients in the storage and cooking of certain foodstuffs and differences in the consumption levels of certain groups may in fact have kept the diets of a good many people considerably below levels recommended by the National Research Council.

Cooperation in Statistical Method

The committee recommended that the statistical material presented in the report be revised and extended at 6-month intervals and that there should be continued international cooperation with respect to developments in techniques for the comparison of statistical and nutritional data. It emphasized the need for data to determine the relative dietary positions of different occupational, income, regional, and other groups. It noted the gradually growing awareness of the importance of nutrition in international relations and the need for international cooperation in peacetime to meet human food requirements.

MAINTAINING WARTIME NUTRITION GAINS

Need for improvement in the nutrition of our people was evident before the war. In 1936, when a large consumption survey was made in this country, probably fewer than one-fifth of the Nation's families

had food supplies that met the recommendations subsequently made by the National Research Council with respect to specified nutrients. Clinical studies served to corroborate the findings of dietary surveys. Convincing evidence that the state of nutrition—in other words, our health and efficiency—was not what it should be came also from selective-service examinations. More than 4,000,000 young men in the United States were classified as unfit for military service.

In 1941 the President called the National Nutrition Conference for Defense, which was followed shortly by the organization of State and local nutrition committees. Also in 1941 the National Research Council announced its recommended allowances of nutrients. The war gave added stimulus to the nutrition cause. The War Food Administration and other agencies took advantage of the fact that under war conditions people become more food conscious and used numerous channels for educating consumers in nutrition as well as in other aspects of the food situation. Nutrition needs entered into the planning of food production and into the allocation of food supplies. This administrative concern for nutritional needs, along with educational programs it inspired, had a strong favorable influence on the Nation's nutrition. Probably still stronger, however, was the influence exerted by the wartime improvement in average family incomes.

Post-war programs should help to maintain the wartime nutrition gains and should promote still further improvement. "An adequate diet for all" should be the goal. Achievement of it calls for combined efforts in many fields, such as public health, education, agriculture, economics, and public administration. Further research in nutrition science may be expected to play a notable part in the work.

Already, a beginning has been made, largely through work done by regional and State groups. Each of the States was asked to furnish a report on its nutritional problems. The reports reveal wide differences in the extent to which different States are aware of their nutrition problems and wide differences also in State activities undertaken to remedy substandard nutrition.

Nation-Wide Nutrition Problems

But many nutrition problems transcend State lines. Family income levels are an example. Education cannot bring about good diets if consumers do not have sufficient money to buy proper food. Average consumer buying power is relatively high at present, but we have no assurance that it will remain so. After the war, publicly sponsored programs may be necessary to bring essential food to many who cannot procure it for themselves in adequate amounts.

The Nation has had some experience along this line already—gained from the direct distribution of surplus commodities during the depression—through the stamp plan and the school-lunch program. The school-lunch program has been continued during the war and has gained support among large groups. It may well be included in post-war plans as an essentially democratic means of achieving a more equitable distribution of food. It provides one of the most effective opportunities for establishing good food habits.

Continued application of nutrition science to the planning of agricultural production and distribution is necessary. Largely a wartime innovation, this policy should be developed and widely extended in the post-war years. It is a means of seeing that markets provide what consumers learn that they should have. Research is showing what varieties of foods and what cultural practices will yield high returns in nutrients. It is also showing what methods of handling and processing are effective in conserving food values. The next step is to make sure that the findings get into the current practice in agricultural production, processing, and distribution. Periodic dietary surveys and studies of nutritional status will help to evaluate the progress we achieve along this line and to direct the course of future programs.

HOW SOIL DIFFERENCES AFFECT NUTRITION

The soil holds many mysteries which scientists are now probing along new lines. In the past they have classified soils according to their productivity, according to their chemical, physical, and biological characteristics, and according to their regional environment. One new approach deals with a classification which may help us to produce not merely more food crops but also foods of greater nutritional value.

This new classification was undertaken by the Department 5 years ago, when it established the United States Plant, Soil, and Nutrition Laboratory, at Ithaca, N. Y. It may prove to be the most important soil classification of all, for modern discoveries in nutrition emphasize the dominant importance of dietary essentials, which can vary widely in food crops according to their source. In terms of the ability of the soil to meet the needs of nutrition and health, yields per acre are frequently a poor measure of productivity.

The same food can vary in nutritive value under the influence of production factors. Data recently reviewed by a member of the Ithaca laboratory staff indicated, for example, that one sample of celery had 280 times more copper than another, and that carrots showed a variation in their iodine content which ranged from 2 to 2,400 parts per billion. Sixty-seven samples of cabbage ranged in iron content from 11 to 305 parts per million.

Surveys have shown that there are many areas in the United States, as well as in other parts of the world, where animals and human beings suffer from nutritional ills because the soils, and consequently the food crops grown thereon, are deficient in one or more of the 13 essential mineral nutrients. In other areas, ailments are traceable to excesses of certain minerals in the soil. Thus far these nutritional troubles have been noted only where they are severe and obvious. They may occur more widely in subacute form and may take an unrecognized toll in health and efficiency from large numbers of our animal and human populations.

These possibilities are now being studied by the Agricultural Research Administration. The knowledge and techniques of soil scientists, of plant and animal physiologists, of biochemists, and of nutritionists are being integrated for this purpose. Rigidly controlled experiments at the Ithaca laboratory are coupled with field studies

throughout the United States. For example, as a part of a study of possible manganese-deficient soils in North Carolina, rabbits are being fed highly purified feed containing all known dietary requirements except manganese. After a time, the test animals display characteristic symptoms which can be used as a measure, in suspected areas, of the adequacy of a forage in manganese content. In other experiments animals are denied cobalt, copper, or adequate amounts of phosphorus, to establish specific symptoms which can be used in detecting area troubles.

Genetic and Climatic Factors

Experiments, with sheep as the experimental animal, are being conducted to determine the influence of fertilization with phosphates on the nutritive value of forages. One object is to show what sort of plants must be produced in the many phosphorus-deficient soils of the Southeast to insure nutritious food for both man and animals. In southern Alabama, for example, and also in many other localities from Florida to Texas, evidences of severe phosphorus deficiencies in grazing cattle are traceable to soil deficiencies.

These areas are now being mapped by the Agricultural Research Administration's laboratory in order to begin a classification of all of our soil types in terms of the nutritional value of foods grown on them. Certain soils in the North and Northeast States, from Wisconsin to Maine, are probably deficient in cobalt and manganese, particularly under recommended farm-management practices followed to increase the yields of forage crops and pastures. These soils are being sorted out, so that farmers can correct the indicated deficiencies when they apply fertilizers.

Soils are not the whole story in the production of a food supply of superior nutritional quality. Genetic and climatic factors are also involved. Studies at the Ithaca laboratory have shown, for example, that the vitamin C content of tomatoes may vary as much as 60 percent, according to the amount of sunshine they receive just prior to harvest. Similar results have been obtained with turnip greens. The data collected in the soil, and climatic and genetic studies are providing practical suggestions or farm-management practices which will step up the nutritive value of our food supply.

Recognition on a national basis of the nature and deficiencies of our soils and of the relationship between climate and the management practices required to produce food of maximum nutritive value is necessary. The interrelationships between soils, climate, plants, and animals are many and complex. Hence, much research will be required to determine the possibilities of influencing the type, the character, and the composition of plants so as to increase their value as food for human beings and as feed for animals.

FINDINGS OF EXPERIMENT STATIONS

Various acts of Congress provide for the support of agricultural experiment stations in the several States and in Alaska, Hawaii, and Puerto Rico. Among them are the Hatch, Adams, Purnell, and supple-

mentary Acts; also Title I of the Bankhead-Jones Act of June 29, 1935. They foster research in agriculture and in problems of the rural home and rural life. Administration of the laws involves Federal supervision of the funds granted and brings the Department into close advisory relations with the experiment stations. In this capacity the Department is represented by the Office of Experiment Stations, which annually examines the work and expenditures of each station and assists the stations in working out programs that will avoid duplication and provide needed integration. This Office administers the Federal Agricultural Experiment Station in Puerto Rico.

Wartime investigations of the agricultural experiment stations have dealt with producing more and better food from plant sources, increasing the supplies of animal products, conserving food resources, producing needed fibers, oils, and special products, and farm adjustments to abnormal wartime conditions. Following are some of the more important findings.

Grain-Crop Investigations

New rust-resistant varieties of wheat, oats, and barley developed by the Texas station, in cooperation with the Department, are especially adapted to the soil and climatic conditions that prevail from central Texas to the southern tip of the State. Austin wheat, first released in 1942, Ranger and Rustler oats, released in 1941, Verde oats, first released in the fall of 1942, and Tunis barley, distributed first in the fall of 1943, are now contributing food and feed to help win the war. Vicland, a new disease-resistant variety of oats, released by the Wisconsin station, was grown on about 50 percent of the State's 1943 oat acreage. Wisconsin farmers produced 5,000,000 bushels of Vicland in 1942. Vicland averaged 78 bushels per acre in 1942, as compared with 53 bushels for other oats on farms throughout Wisconsin. Ohiogold No. 1, a new yellow hybrid sweet corn developed by the Ohio station, was offered to the growers for trial in the 1944 season. This new variety in a 3-year comparison with Golden Cross Bantam outyielded the latter by 18 percent, ripened 6 days later, and was rated sweeter in flavor. Studies by the Indiana station on the thiamine content of wheat revealed that some varieties possess 20 percent more thiamine than others. Wheat grown on well-fertilized soil averaged about 10 percent more thiamine than that on unfertilized soil of the same type. Thus, it is evident that selection of varieties of high thiamine content produced on well-fertilized soil will frequently result in wheat of relatively high thiamine potency.

Corn on plowed land in experiments at the Ohio station since 1938 has yielded 10–15 bushels per acre more than that on unplowed land. Areas given normal cultivation made some gain over land plowed and then planted without further seedbed preparation. Even such areas, however, yielded considerably more than plots prepared by the alternative procedure of roto-tilling, with subsurface tillage, and with surface cultivation only. Many of the systems often proposed to replace the plow in corn production would leave considerable trash on the surface. This would be advantageous where erosion

is serious, but a standard measure to prevent corn borer infestation is clean tillage. A comparison at the Nebraska station of three varieties of ground sorghum grain versus cracked corn in the ration of fattening steers gave evidence that the sorghum grains are as easy to feed as corn and give approximately the same average daily gains. The efficiency of gain favored corn, however, since only 90–96.5 percent as much corn as sorghum grain was required per unit of gain.

Feeding Experiments

In two series of feeding experiments, each of 100 days or more in duration, the Ohio station found no significant differences in the production of milk or butterfat or in the general health of milking cows from the feeding of practical grain mixtures ranging in average fat percentage from 4.89 to 2.69. These findings are significant in that it apparently makes little difference whether grain mixtures are balanced for protein content by the addition of solvent extracted meals, expeller meals, or ground oilseeds. Producing pork on Great Plains area feeds has received special consideration. The grain sorghums, more drought-resistant than corn, produce more satisfactory grain yields in much of the area. Results of feeding trials at the Kansas station indicate that pork can be produced satisfactorily with grain sorghums. Hogs fattened in a dry lot gained 1.46 pounds per head daily on shelled corn, 1.52 pounds on ground Colby milo, and 1.49 pounds on ground Wheatland milo.

In studying the wintering of cattle with a minimum of concentrate feed, the Kansas station fed three lots of good quality steer calves a basal ration consisting of Atlas sorgo silage and cottonseed cake. One lot received no additional grain; one lot, 4.2 bushels of grain; and one lot, 8.3 bushels of grain during the winter. These three lots gained 159 pounds, 183 pounds, and 209 pounds per head, respectively, during the winter. All three lots were raised together during the summer. At the end of the grazing season, there was only 3 pounds per head difference in the three lots. This emphasizes that maximum growth and development can be secured on stock calves without feeding grain the first winter. Immature soft corn damaged by mold and rot had relatively high feeding value for steers, pigs, and lambs in experiments at the South Dakota station. Cattle fed the soft corn actually made faster gains than those fed good No. 3 ear corn. Pigs and lambs made only slightly slower gains on the soft corn than on good corn. One hundred pounds of hard corn was equivalent to about 121 pounds of the soft corn for both steers and pigs or 135 pounds for lambs. Thus it is evident that late corn which fails to mature before frost still has a rather high feed-lot value.

Feeding Value of Dockage

The feeding value for dairy cows of wild mustard seed (*Brassica arvensis* Ktze.) and fanweed seed (*Thlaspi arvense* L.), which constitute a high percentage of the dockage in grains in the Great Plains area, was investigated by the Montana station. Both were found to

be relatively rich in protein and fat. When the finely ground seed obtained from grain screenings was used to replace soybean meal in a conventional-type dairy ration, the quantity of feed required to produce a unit of milk or butterfat was practically the same on the soybean meal as on fanweed-seed rations, and slightly lower on the wild mustard seed ration. When the rations containing the weed seed were fed immediately after milking, no undesirable flavor was imparted to the milk. There was no indication that the feeding of either of the weed seeds was detrimental to the health of the cow. Experiments by the Missouri station with milking cows and fattening lambs gave evidence that ground lespedeza seed is practically equal to cottonseed meal or soybean meal as a protein supplement. With poultry the whole lespedeza plant was successfully used. Seed from this crop represents a potentially important source of protein. More than 8,000,000 acres are produced annually in Missouri, with seed yield frequently exceeding 400 pounds per acre.

Dairy and Poultry Findings

Dairy research at the Pennsylvania station has indicated that the oxidation of lecithin, a constituent of the membrane surrounding the fat globules of milk, is the main reason why dried whole milk becomes stale so rapidly in storage. Huge quantities of dried whole milk are being purchased by lend-lease and military authorities, but it has to be used rather quickly, since it develops off-flavors and odors after it has been in storage a few months. Removal of about half of the lecithin during the process of dried-milk manufacture improved its keeping qualities considerably. Laboratory samples of ordinary dried whole milk stored in airtight containers became stale in a month at 85° F. Others sealed in nitrogen developed a slight off-flavor in 2 months. Samples of this product sealed in nitrogen did not become even slightly stale until the end of 3 months, and were in no worse condition at the end of 5 months.

At the Missouri station quality in shell eggs has been stabilized by immersing eggs in liquids and circulating heated air around the eggs. A relatively low temperature (about 140° F.) was used so that the heat could penetrate the eggs before any part of the egg was coagulated. When fertile eggs were treated by this process, embryonic development was immediately and permanently arrested and the eggs were rendered infertile. The albumen of shell eggs was stabilized so that the normal breakdown of thick albumen was greatly retarded. Treated eggs kept their commercial grade much longer than untreated. Cooking tests showed that eggs held at room temperature for different periods of time were definitely superior to untreated eggs. Commercial concerns have already begun preparations to use the process of egg stabilization. Widespread use of it will save millions of dollars worth of eggs annually.

Cockerels with red combs, large size and plumb breasts at 8 weeks of age are best for next year's roosters, according to work at the Oklahoma station. Records of birds in station flocks show that if a cockerel's comb is not red by 8 weeks, poor fall and winter egg production

may be expected in his daughters; the one with the red comb has grown the greatest percentage of his adult size, and gives this tendency to his offspring; the largest cockerel has eaten the least feed per pound of meat and will improve economy of gain in his offspring; and plumpness of body is highly hereditary.

The New Jersey station recently completed the first year's work in an experiment on poultry ranges, in which six pens of birds were involved. Four of them, fed mash and grain, were given access to range for 12 weeks in the summer, each range having been seeded the preceding year to a different mixture of grasses and legumes. Birds in a fifth pen were kept in confinement and fed on mash and grain only. Those in the sixth were placed on range, but given no mash. In comparison with those in the confined pen, all range-raised groups showed a considerable saving in feed, particularly in mash consumption. The most efficient weight gains were made by the group on a range planted to Kentucky bluegrass, Canada bluegrass, redtop, and red fescue. A mixture of red clover, alfalfa, ladino clover, and birdsfoot trefoil proved the least efficient of the four ranges tested. Although chickens are believed to have no sense of taste, it was apparent from this work that some factor causes them to exhibit marked preferences. Redtop, for example, seemed to be preferred over all other species. Red clover, on the other hand, was eaten scarcely at all.

Progress With Vegetables and Fruits

In connection with greenhouse tomato production, the Missouri station found that seedless tomato fruits of better size and quality than those from normal pollination can be produced if the pistil of a tomato flower is treated with a salve made by mixing with lanolin the residue from a crude alcoholic extract of corn kernels taken 10 to 15 days after the silks first emerge from the ear. The activity of this extract surpassed that of any synthetic chemical known to induce seedless fruit. The Early Chatham, a new extra-early variety of tomato, has been released by the Michigan station. It matures at least 1 week earlier than other common varieties of that area, and this earliness makes it particularly adapted to the Upper Peninsula and other areas of that latitude. It originated from a three-way cross, Break O'Day×Redskin×216 (an unnamed selection).

Increased tomato production in Hawaii in 1943, reported to be three times that of the year before, was made possible by the planting of the deteminate types at low elevations during warm weather. The yearly income to Hawaiian farmers from tomatoes of this type, starting with the Bounty variety developed at the North Dakota station, is figured at over half a million dollars. This introduction by the Hawaii station in connection with its extensive tests of tomato varieties has already paid the cost for several years of vegetable research at that institution.

The Pennsylvania station has developed two new tomato varieties—Stemless Pennorange and Stemless Pennred—which should be welcomed by all Victory gardeners of the State. Their fruiting habit is distinctive since, unlike most commercial varieties, they bear fruits at

short intervals on secondary branches. This bearing habit results in a product of more uniform size than that borne in the usual type of clusters. The stemless character is valuable in that no stem remains on the fruit when picked to puncture other fruits in the basket; the expense incurred in removing the stems is also eliminated.

The Kasota potato, developed by the Nebraska and Minnesota stations and introduced into Nebraska in 1942, was outstanding in 1943 in Nebraska in extensive tests and in commercial plantings. The variety produces good yields of fine-type tubers and is resistant to fusarium wilt. Enough seed to plant 100 acres in 1944 was available in Nebraska. Work at the New Mexico station revealed that a fall crop of potatoes can be produced in that area, a fact of considerable value to home gardeners in the southern part of the State. This has not been possible in the past owing to the inability of growers to obtain a stand. Studies by the station have shown that this difficulty may be overcome through use of proper planting procedures and seed treatment.

The L 4–5 variety of sweetpotato produced by the Louisiana station, having twice the vitamin A content of the standard variety, Unit 1 Porto Rico, is being tested under quick-freezing methods. One commercial organization is planning to use this variety as a carbohydrate filler and vitamin A fortifier in candies, and a large alcohol distilling company has become active in Louisiana with the idea of using this sweetpotato for the manufacture of industrial alcohol.

A new variety of cantaloup, Arizona No. 13, was recently released by the Arizona station. This variety, the first entirely new variety of cantaloup developed in the current breeding project, combines an excellent shipping quality with a superior flavor and edible characteristics and is believed to be a substantial improvement over existing kinds. Seed production has been started to insure the permanency of the variety.

Research in Oil Crops

The Minnesota station estimated that loss to flax growers in Minnesota from weeds in the 1941 flax crop probably exceeded 3 million dollars, including loss in yield of grain from weed competition, reduction in marketability of straw, and cost of shipping dockage to market. The station determined that dockage (primarily of weed seeds) in 7,413 cars of Minnesota flaxseed received in Minneapolis from August 1941 to July 1942 averaged 11.3 percent—about 1 car for every 10 cars of clean flax. Removal of dockage at country shipping points has some merit as a temporary measure, but the station finds that the most logical place to combat the problem is on the farm, in weed control by planting clean seed on clean land, crop rotation with frequent use of cultivated crops, early seeding, sowing legumes and/or grasses in mixture with flax as companion crops, and use of weed sprays.

Fungicides and Insecticides

A new fungicide, disodium ethylene bisdithiocarbamate, discovered in tests by the Connecticut (State) station appears to have an unusual

combination of qualities. It goes into solution in water, does not settle out of suspension, flows evenly on plant tissue, is invisible and water insoluble on drying, resists removal by rain, and has negligible toxicity to plant tissue. Further experiments with the material are needed, however, since it runs off foliage rapidly during spraying and the deposit left on the foliage is exceedingly thin, especially on plants like potatoes and tomatoes.

In 1935 the New Jersey station undertook a fellowship research project on protecting man from insect annoyances by the use of repellent solutions. On the outbreak of the war, it cooperated with the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture, the agency which had been designated to carry on a research program for repellents for military use. Work started early in 1942. The station reports that—

> By midsummer "Formula No. 612," a solution developed at the New Jersey station, was approved for use by the Army. This repellent is many times more effective than the best of its predecessors. It has no unpleasant odor, is not injurious to man or materials, it stands up under severe storage conditions, and is inexpensive to manufacture. "Formula No. 612" is now being manufactured commercially for use by the armed forces. A recent War Department release captioned "Disease Prevention Measures Effective in North Africa" says: "One of the most effective forces against the hordes of mosquitoes has been a new lotion which the soldier rubs on his face and hands and other exposed parts of his body. Only a few drops are required. A single application of the lotion repels the mosquitoes for at least 400 minutes . . ." The lotion referred to included our "Formula No. 612."

The Michigan station found that if plants infested with squash bugs were slightly jarred or disturbed the insects dropped to the ground. Covering the insects on the ground with a thin layer of soil was an effective control measure since the nymphs were unable to emerge from the soil. Instead of making separate applications for insects and fungus diseases, cucumber growers now can control both types of pests with a combination dust as the result of experiments at the Louisiana station. Yields have been increased from 26 to 56 percent over those obtained with the standard spraying program, which involves much more labor. The dust mixture includes cryolite, an insoluble copper compound, Black Leaf 10, Pyrax clay, and soft wheat flour.

New Poisonous Plant

Discovery of a new poisonous plant by the Nevada station explains recent heavy losses of sheep on the range. *Halogeton glomeratus*, a comparatively recent plant introduction not previously recognized as poisonous, caused death of sheep in experimental feeding due to high concentration of oxylates. This establishes the cause of sheep losses running into large numbers over recent years. Local distribution of the plant has been mapped by a quick survey.

ACHIEVEMENTS IN PLANT SCIENCE

Crop improvements have been an important wartime factor in increasing our supplies of food, feed, oils, fibers, and various other raw materials. As an example, 43 new and improved varieties of crop

plants are included in this year's report, in contrast with 35 last year. A large share of the valuable results in this and related fields have come from cooperative work with State experiment stations and other research organizations.

Working closely with the plant scientists are soil and fertilizer specialists and agricultural engineers. The entire group provides not only plants with better innate characteristics, but also better methods and machines for growing and harvesting, and in some cases improvements in methods and machines for preliminary processing. Some of the new developments have been the result of sudden demands for materials formerly imported, such as drugs and fibers, but a large number have been in the production of well-known crops such as corn, small grains, and forage plants.

The creation of highly productive hybrid varieties of corn by the specialists of the Department and a number of cooperating State experiment stations is an outstanding example of research achievement. It has been noted in several recent annual reports.

The results in hybrid-corn production have occupied a prominent place in the record, both from the standpoint of research and from the standpoint of the rapid increase brought about in the acreage of hybrid varieties in the Corn Belt and elsewhere. A dozen new hybrids for the South were among the last year's new varieties. In 1944 more than 57 percent of the country's 100,000,000 acres of corn grew hybrid varieties, many of them resistant to root, stalk, and ear rots and various seedling diseases, and adapted to machine harvesting.

In Iowa and some of the other Corn Belt States practically 100 percent of the corn acreage is now planted to hybrids. Farmers in other areas, where corn is less important, are giving more attention to hybrids. The cooperative corn-breeding program has developed good hybrids for the South, particularly Tennessee, Louisiana, Mississippi, and North Carolina, where the proportion of the acreage planted to them in 1944 was respectively 10, 4, 4, and 2 percent. Specialists expect the developments with hybrids in the Corn Belt will soon be repeated on a smaller scale in all corn-growing States. Once a good supply of seed is grown locally, the acreage of hybrids goes up rapidly.

So far U. S. Hybrid 13, developed by corn breeders of the Department and Corn Belt experiment stations, continues to be the most important variety. Iowa grew 5,454 acres of seed of this variety; Illinois, 2,355; Indiana, 1,509; Ohio, 1,402; Kentucky, 1,035; Nebraska, 1,019; Missouri, 412; and Kansas, 216. Altogether the States produced 469,000 bushels for planting more than 3,283,000 acres. No. 13 rose to this prominence because of high yields, resistance to lodging and disease, and adaptability to a wide range of soil and climatic conditions.

The benefits of hybrid vigor and other good hybrid qualities have been added by the plant breeders to sweet corn and popcorn. Golden Cross Bantam hybrid, developed by the Department and the Indiana Agricultural Experiment Station, for example, has practically remade the commercial yellow sweet corn canning industry. There are new hybrid popcorns that have a popping expansion of from

26 to 33 times their original volume, or about 15 percent better than that of the best open-pollinated varieties. Certain of these hybrid popcorns developed by the Department and the Kansas Agricultural Experiment Station also yield 50 percent to 100 percent more corn per acre than the best of the others.

Commercially Feasible Onion Hybrid

The most important hybridization news from the Department's plant breeders this year, however, was the announcement of the first commercially feasible onion hybrid. Producing hybrid onion seed on a commercial scale had seemed impossible because of the nearness of the male and female flowers. But an onion plant was discovered with male-sterile flowers; that is, flowers with no fertile pollen. When this strain was grown alongside normal onions the experimenters were sure that the seed on the male-sterile plant would be hybrid seed. The first practical result was the announcement, in the spring of 1944, of a new early onion, California Hybrid Red No. 1, developed by the Department and the California Agricultural Experiment Station. This onion, adapted to growing in central California, southern Utah, and southern Nevada, produces at least 25 percent larger yields than the best varieties that have been grown previously in these areas.

The wide importance of this new development in hybridization lies in the fact that plant breeders now feel confident they can produce high-yielding hybrids of almost any of the onion varieties for all regions, seasons, and purposes. Plant scientists hope for similar improvements in various other crops. In this development they see a way to build up farm productive capacity at low cost.

Virtual Creation of Crops

The records of the Department tell of plant improvements that have virtually created crops. The blueberry is an example, and the development of better varieties of blueberry still goes on. Scientists have found male-sterile strains of grain sorghum that give them hope of producing hybrid strains, such as may provide advantages for this crop similar to those now enjoyed by corn growers. Forage-crop specialists, encouraged by work with self-sterile strains of alfalfa and the clovers, are looking for greater yields, disease resistance, and other desirable characters.

Small grains continue the upward trend in yields and disease resistance as a result of the efforts of the plant breeders to create better varieties for specific areas. The whole cereal-variety picture has been made over since World War I. This fundamental change is one of the important factors in the Nation's present strength in bread grains and in sources of alcohol for making explosives. Changes continue to take place as efforts are made to supplant old varieties with better adapted new ones.

On the 65,000,000 acres devoted to wheat, new varieties have supplanted or are supplanting old ones. A score of recent varieties could be named for the various areas. In the Kansas-Nebraska-Oklahoma

section, Tenmarq, Pawnee, Comanche, Wichita, and other hard red winter wheats are resistant to leaf rust, stem rust, and bunt. In the Dakotas, Minnesota, and Montana, the new ones include Pilot, Rival, Newthatch, and Mida; these are resistant to stem and leaf rust. There are new rust-resistant durum wheats in North Dakota, and bunt-resistant varieties in the Northwest and Intermountain areas. New varieties are also making progress in eastern areas where wheat suffers from virus diseases, leaf rust, loose smut, and hessian fly.

In the principal oat-producing States this crop has been stabilized with disease-resistant varieties. In 5 years the change has been phenomenal. The acreage of the better varieties (Tama, Vicland, Boone, Marion, Control, Vikota, and Cedar) went up to 15,000,000 from 1940 to 1944.

Many changes have taken place in barley varieties for the 15,000,000 acres devoted to that crop. There are new stiff-stalked, disease-resistant grain sorghums for combine harvesting in Texas, Oklahoma, and Kansas, which have cut losses and increased returns to growers by an estimated $11,000,000 a year. A dwarf waxy sorghum, Cody, was sowed on 32,000 acres in 1944 as a source of one of the newly developed substitutes for cassava starch, formerly brought from the East Indies.

More than half the United States rice acreage is of new varieties produced through the cooperative breeding program.

Better Cottons Developed

Progress in building up the uniformity of cotton through one-variety communities has continued year after year. In 1943 there were programs of this sort in 2,490 communities in 549 counties, with more than 300,000 members and a total acreage under agreement of nearly 9,000,000. The specialists have figured that in that 1 year farmers in the one-variety communities, by turning out a uniform product of superior quality, have obtained $6 extra for every acre in the crop, or a total gain of $54,000,000.

Competition of other fibers, both natural and synthetic, has stimulated a demand for stronger cotton fiber, a demand that is being met through State and Federal research on varieties in the main Cotton Belt and in the American Egyptian area of the Southwest. The stronger varieties produced for the Mississippi Valley and the Southeast are now being used in standardized production in one-variety communities, a big step forward. The new variety Acala 1517, bred at the New Mexico Experiment Station, is stronger than any other cotton of its length and is now in general production in the irrigated sections of New Mexico and West Texas. In Georgia the new variety Empire went into production in one-variety communities for the first time this year. In the Mississippi Valley and the Southeast there are two stronger new ones, Deltapine 14 and Coker 100, that are now planted on larger areas than any of our other improved varieties of cotton.

Grass Crops, Soybeans Interest Researchers

Efforts to increase the yield of grass generally (grass, in this case, means forage) are now being applied on a new front, with promise of large results. This is the work of hybridizing alfalfa, which the forage crop specialists look upon as a means of attaining more progress than ever before. Experiments by the Department and the Nebraska Agricultural Experiment Station show that some of the hybrids, besides being significantly better in yield, are resistant to the destructive bacterial wilt and to the yellowing caused by leafhoppers. Some of these leafhopper-resistant hybrids contain twice as much carotene (vitamin A) as the standard varieties. Carotene is a factor of outstanding importance in cattle feed.

In an important part of the alfalfa-growing area, a part in which corn is also one of the chief crops, the soybean has grown to be a prime producer of feed and oil. Any improvement that builds up the yield or quality of this crop is of economic significance. The announcement by the Department and the Illinois Agricultural Experiment Station of the new variety Lincoln, with an average yield 5 bushels an acre ahead of the two best-known varieties in the North Central States and with 0.7 percent more oil, is therefore of considerable importance. With 291 bushels of seed of Lincoln harvested in 1942, the seed crop in 1943 was 13,345 bushels. During the past season 900 farmer cooperators grew nearly 20,000 acres of this variety, enough to provide seed for 400,000 acres in 1945. In future the variety can be on a full commercial basis and will give any farmer who wants it a quick advantage.

Potato Research

Steady progress continues in the national potato breeding program, which has produced better varieties for various regions. The Department has obtained new facts of benefit to growers and consumers of this important food and industrial crop. For example, studies show that potatoes for dehydrating must be fully mature if they are to make a good-quality product. This is an important fact in view of the increase in the manufacture of dehydrated potatoes from practically none in 1941 to 136,700,000 pounds in 1943 and an estimated total of nearly 144,000,000 pounds in 1944. Records obtained from the principal potato-producing States, all of which take part in the national potato-breeding program, show that at present about one-third of all certified seed potatoes are varieties introduced through the program during the past 11 years. The better varieties—higher yielding and more disease-resistant—have been largely responsible for the fact that the average production of the past 5 years has been higher than that of any other 5-year period.

New ways have been developed for fertilizing the potato crop. Field tests in Maine, New Jersey, Pennsylvania, and Virginia have shown that "spent-acid" superphosphate fertilizers produce as high yields of potatoes as superphosphate made with clear sulfuric acid, a material now in heavy demand for war and industrial uses. Other cooperative potato tests in Maine have shown the presence in heavily

fertilized soils of accumulated available phosphorus sufficient to permit large reduction in phosphate applications with considerable saving by the potato growers of that State.

Recent research has also provided strong evidence that waste potato piles may spread late blight and that early harvesting reduces virus diseases in seed stocks. The golden nematode, a new and dangerous potato pest found on Long Island in 1941, has increased until it now extends over an area of nearly 1,000 acres.

Rubber Investigations

Studies of rubber-producing plants by the Department's specialists have produced results of value. In cooperative projects in tropical and subtropical America they have assisted in bringing the hevea rubber tree growing from the nursery stage to large-scale field planting and in building up the technical skill of local growers. By getting improved methods adopted in Mexico and Costa Rica, the specialists have assisted especially small-scale rubber growing in these countries. Breeding work on hevea production in Brazil has included more than 50,000 hand pollinations of Brazilian and Oriental strains. In other Latin-American countries and in Florida progress has been made in developing strains that combine high yield with resistance to South American leaf blight, a destructive disease of rubber trees.

Fertilizer and Soil Problems

Research has made possible the satisfactory use as fertilizer of a large excess production of ammonium nitrate, made available by munitions plants. To do away with caking of this chemical, the Department scientists, in cooperation with producers, devised means for producing a new product—granular ammonium nitrate. As a result, in the fertilizer year 1943–44, farmers had available some 350,000 tons of this surplus explosive material, distributed to them through regular trade channels for use as a fertilizer. Experiments quickly solved the problem of handling and distributing this nitrogen fertilizer by means of the ordinary placement machines.

In dealing, on the other hand, with a shortage of fertilizer material, the fertilizer chemists, in cooperation with other agencies, found a solution for the problem of getting a substitute for bonemeal, much used in livestock feeds and long imported in great quantities for that purpose. The chemists at the Plant Industry station found that rock phosphate and superphosphate, which are undesirable as feed constituents because they contain too much of the element fluorine, can by a relatively cheap method be made safe for direct feeding to livestock. As a result of this discovery farmers have a new source of this feed material, which should prove good in peacetime as well as in wartime.

Soil technicians, with chemists and crop specialists, have provided information for selecting soils for much-needed war crops. Soil survey maps have been prepared which show where such crops as peanuts, hemp, castor-beans, and guayule may be grown with best results. Soil maps covering half the counties in the United States were available at

the beginning of the war; they provided a basis for determining application of soil facts to crop facts.

Crop-Seed Research and Experimentation

Advances in domestic crop-seed production in certain special fields, such as sugar beets, have helped to insure supplies for ourselves and other countries. Extensive trials during the past year have shown the practicability of extending profitable production of carrot and table beet seed to the "eastern slope" in Wyoming and Colorado. Various areas in Utah have proved well adapted for growing carrot seed. These new seed-growing areas, along with those in other localities, tend to spread the risks involved and to provide increases to meet seed emergencies.

Domestic production of seed of improved, disease-resistant varieties of sugar beets had been going on for some time before the war. As a result, the United States became self-reliant in the production of seed for its sugar-beet crop. Formerly it depended exclusively on European seed; now it is accumulating a surplus large enough to help in supplying emergency needs in European countries. In 1943 the United States production was 15,625,000 pounds, including 6,000,000 pounds of varieties resistant to curly top disease, important in the Western States, and 1,700,000 pounds of new varieties resistant to leaf spot and adapted for growing in Michigan, Ohio, Illinois, and Wisconsin. More than half the large production of sugar-beet seed is now of improved varieties originated by plant breeders of the Department. The rest consists of improved varieties produced by the beet-sugar companies.

The large-scale economical production of sugar-beet seed as a domestic enterprise was made possible through the development by the Department and the New Mexico Agricultural Experiment Station of a method of field overwintering of plants that not only saves hand labor but saves much time in increasing the seed supply of new varieties.

Breeding of Drug Plants

The Department's drug-plant gardens have provided information and propagation material that have made it possible to develop production in this country and other countries of this hemisphere of a great variety of these crops, including belladonna, digitalis, and pyrethrum. Promising results have attended the breeding of devil's shoestring, the only native plant that has been found to yield any substantial amount of insecticide. It grows in the South Atlantic and Gulf Coast States. Here and there a few plants have been found containing as much as 2 percent of rotenone in the roots. Most of the wild plants of the species contain none. Breeding and selection have resulted in a considerable production of plants with 2¼ percent of rotenone in the roots and with an average yield of approximately 2,500 pounds of dried roots to an acre from 2-year-old plants. Some greatly improved strains have been bred containing 8 to 9 percent of rotenone, enough to make them promising for growing in some localities in the

Gulf Coast for local insecticide use, and possibly also as a commercial source of the insecticide.

Agricultural Engineering as War Activity

Linked closely with the work of plant breeding is that part of the program of the agricultural engineers which deals with the development of new labor-saving machines to suit the new varieties and new crops, which will reduce labor requirements and increase the quality of the product. Perhaps the most recent development in such machinery is the peanut harvester, which was developed to meet the wartime increase of peanuts from two to four million acres while available labor was markedly decreased. This harvester digs the peanuts, shakes and cleans the vines, and piles them in windrows for drying, using only one-tenth the pre-war labor requirements.

Then, too, the engineers have been developing plans for improved buildings to save a larger part of the crops produced to reduce labor required in storing foods and feeds and to use less lumber, steel, and other materials that have been critically scarce during the war. A discovery of great importance, particularly in the southern part of the Wheat Belt, is that painting metal bins white so reduces the wheat temperatures in the spring as to delay the development of insect infestation for a month or more.

The engineers have also been improving machinery for the better preparation for sale of farm products, as, for example, a device used in baling ginned cotton which almost entirely eliminated air-cut and "rolling" bales; a machine for decorticating sansevieria, a fiber grown in this country and used in marine cordage as a substitute for manila hemp; and an experimental machine for determining the safe limits in the compression of dehydrated foods.

ENTOMOLOGY GOES TO WAR

Scientists in the Bureau of Entomology and Plant Quarantine carried on studies a few years ago to find a way to distribute fine particles of insecticides without the use of bulky materials as carriers or diluents. They discovered that a number of commonly used insecticides could be dissolved in certain gases which are liquid when held under pressure at normal atmosphere. When the pressure is released, the gases "boil out" and carry the insecticides with them.

As the gases disperse, fine particles of the dissolved insecticide, so small as to be invisible to the unaided eye, are left suspended in the air, or settle slowly and adhere to surfaces with which they come in contact. If they lodge on insects or on material consumed by insects, the particles are as insecticidal as if they were carried by other means. This invention provided an entirely new method of applying insecticides, for which a public-service patent has been issued.

Shortly after Pearl Harbor, the Surgeon General's Office of the Army asked the Bureau of Entomology and Plant Quarantine for a simple, rapid, and effective method of killing mosquitoes and other insects in closed spaces, such as the cabins of airplanes.

Experiments with the aerosol method indicated that it might be well adapted for this purpose, since it can be used to disperse certain

materials that are highly toxic to mosquitoes and flies but not toxic or even irritating to man. Entomologists and collaborating chemists quickly developed suitable formulas, provided data as to the rate of application and the exposure period, and prepared specifications as to the required insecticidal materials. In addition they developed containers that could be used to hold and disperse the insecticide satisfactorily under various conditions. Small cylindrical containers, which hold 1 pound of the insecticidal mixture, proved the handiest for most places. They soon became known as aerosol bombs. Trials demonstrated that the method was effective, and the military authorities arranged at once to use it extensively.

Effective Insecticidal Aerosol Developed

Best results followed use of a concentrated pyrethrum extract in the insecticidal mixture. The particular extract desired, however, was not a standard commercial product. Accordingly, the Bureau assisted manufacturers in developing ways to make it in large quantities and to keep it free from irritating properties and impurities. Hardly were the specifications completed when it became evident that the supplies of pyrethrum flowers, which are not grown commercially in the United States, would not be adequate for expanded military requirements. Scientists tackled the problem of stretching the available supplies. They found that by adding small quantities of sesame oil the amount of pyrethrum in each container could be reduced with no loss of effectiveness. The added material exercised a cooperative action. Pyrethrum, however, became even scarcer. Further research made it possible to modify the formula again and also to develop specifications for an insecticidal aerosol which would effectively kill mosquitoes. As is well known, mosquitoes are carriers of important diseases.

Specialists in the Bureau of Entomology and Plant Quarantine have carried on investigations in this new method of dispersing insecticides in connection with insects that attack crops. They have experimented with many kinds of insecticides and used various kinds of propellents. They believe that the aerosol method can be used for the control of certain insect pests in greenhouses and similar structures. In fact, their studies indicate that gas-propelled insecticides may have an important place in the control of certain pests that attack truck crops. When needed materials can be made available for such a purpose, aerosol "bombing" may prove of great value to truck growers.

Pink Bollworm Situation Alarming

Inspections of gin trash from the cotton crop of 1943, by a method developed and used as the principal first aid in detecting infestations, indicate the presence of the introduced pink bollworm in new areas of Texas and in limited sections of Louisiana. Search in areas from which the cotton that provided the trash came, resulted in the finding of living pink bollworms in unpicked bolls. The discovery was a matter of concern to pest-control officials and the cotton industry. As soon as needed facts were assembled, the States of Texas and Louisiana took

appropriate quarantine action. Later, the Federal quarantine was amended to include the new area.

In areas where infestations were located, crop remnants were cut, piled, and burned to kill worms that would be likely to hibernate. In parts of Louisiana, the State prohibited the planting of cotton for the crop season 1944, as the most effective means of eradicating the infestation and protecting uninfested areas. Much evidence indicates that these newly discovered infestations are the result of natural spread of the moths, either from areas where this pest is well established in Mexico or from the infested area of the lower Rio Grande Valley of Texas.

Inspections in 1943 in the lower Rio Grande Valley of Texas and in Mexico disclosed pink bollworms in many cotton fields, and indicated an increase in the infestation in this general area. Vigorous steps were taken to secure clean-up of stalks and crop remnants as required by regulations. This was not accomplished throughout the infested area at the time prescribed though over most of the area the job was done well. It was hoped, nevertheless, that the situation in the section adjoining the main Cotton Belt would be improved. But inspections in the early part of the 1944 crop season were not reassuring. Though entomologists did not find infestations in some fields where worms were most numerous in 1943 and where clean-up was completed shortly after harvest, their field inspections located worms in many fields where they were not detected last year.

Apparently the infestation is more widely scattered and possibly heavier than in any preceding year. Cooperative Federal-State activities and cooperation with Mexican officials will promote an early and thorough clean-up following the harvest, and will seek full compliance with prescribed requirements. Unless these or other practices suppress the infestation in the lower Rio Grande Valley, this introduced pest, like the boll weevil, will ultimately spread by natural means through the main Cotton Belt. Producers will then have to contend with the two most destructive cotton pests—a condition that does not exist in any other important section of the world where this major crop is grown. This added burden of insect control might prove to be extremely costly.

New Program for Grasshopper Control

Cooperative effort during the last 7 years to protect crops from grasshoppers has reduced these pests. In some areas the control programs have been the primary factor in suppressing important species. In other sections weather conditions have prevented any intensive outbreak during the war years. Yet grasshoppers have occurred in destructive numbers in some sections, even in the absence of weather conditions favorable for their rapid general increase. Grasshoppers have been numerous this year in sections of Nebraska, Kansas, and the Dakotas and have threatened crops over considerable areas.

Some important changes have been made from the control procedures previously followed. Shortage of labor has necessitated mechanization of the control program as far as possible. In order to economize short supplies of grasshopper bait, it has been necessary to coordinate the work fully and to supervise it closely. The new program has provided

for the application of bait on roadways and on abandoned and idle land adjacent to cultivated areas. Paid crews do this work; farmers apply bait on cultivated lands. Equipment, manpower, and supplies used in this way frequently suppress relatively minor, and check more serious, infestations.

Crop losses have occurred in some sections, though restricted for the most part to the margins of fields. But the results so far of the season's work indicate that the new program is sound. If inspections for overwintering eggs confirm this indication, the Bureau will work with cooperating States to remodel the grasshopper-control program generally, with the objective of preventing the development of wide infestations. Full employment of the new practices should ultimately reduce the cost of grasshopper-control operation, and at the same time reduce crop losses to a minimum and give reasonable assurance to farmers that grasshoppers would not destroy their crops. The success of the plan will depend, of course, on the cooperation of farmers and State and local agencies.

Control of Plant Diseases

Labor and certain materials have been in such demand during the war period that operations by the Bureau of Entomology and Plant Quarantine and cooperating States against certain important pests have been reduced to a holding basis. Three important programs affected are: (1) Activities aimed at destroying barberry bushes that serve as alternate hosts of stem rust, which injures small grains; (2) operations to destroy currants and gooseberries, the alternate hosts of white pine blister rust; and (3) the effort to eliminate peach trees infected with the phony peach disease in the eastern part of the United States and peach mosaic disease in the southwestern area. Current programs against these four important plant diseases have aimed to prevent them from increasing in intensity and from invading new areas. Benefits from control programs conducted in the pre-war period have not yet been lost. Little progress, however, has been made during the war years in the cooperative effort to suppress these diseases.

Disease To Kill Japanese Beetles

Current observations support previous conclusions that the so-called milky disease helps to control the Japanese beetle. Scientists of the Bureau of Entomology and Plant Quarantine some years ago discovered a bacterial disease that kills the grubs of this introduced pest. They developed procedures for collecting and preparing the disease organisms for use in control operations. They found that the disease organism may persist in its quiescent stage over long periods; that it is specific to the Japanese beetle and a few other closely related injurious beetles; and that it can be mixed with talc and other ingredients and distributed in situations where the grub will ingest the disease and die.

Accordingly, the Bureau of Entomology and Plant Quarantine and cooperating States undertook to colonize the disease in areas where Japanese beetles are abundant but where the disease does not occur. The disease has increased in these areas, and has contributed to the re-

duction of the beetles. Moreover, the beetles themselves have aided in spreading the disease. Like all biological processes, the building-up of disease populations requires considerable time, and the effectiveness of the procedure cannot be definitely foretold. That the disease may help in reducing the numbers of the beetles, the current season's experience has shown. But it is too early to say how effective it may be in all areas where the Japanese beetle may occur. To protect the public's interest in this method of Japanese beetle control, the discoverers have obtained a public-service patent. Licenses have been issued to individuals and agencies interested in producing and marketing the disease. It may be bought by home owners and others who want to combat the Japanese beetle.

RESEARCH AIDS ANIMAL INDUSTRIES

As the war proceeds, our dependence on research to solve problems relating to livestock production becomes increasingly apparent. Specially needed are superior types of livestock, improved methods of production, and safeguards to livestock health. The research results of past years have proved valuable in the war emergency. Accomplishments of research in the war years will also have profitable application in the ensuing years of peace.

Progress in Swine Breeding

At its regional swine-breeding laboratory, established at Ames, Iowa, in 1937, the Department is cooperating with 13 State experiment stations in a coordinated program on basic breeding problems directed toward more efficient types of swine. Forty inbred lines have been developed within five breeds and two crossbred foundations; and different intensities of inbreeding are under study. Results thus far have shown slight decreases in fertility, vitality, and rate of growth, as inbreeding has advanced. They indicate, however, that in genetically good stock the rate of inbreeding can be increased from 5 to 10 times that practiced by practical breeders, without serious loss of individual merit. This high rate of progress makes possible a more rapid fixing of characters that have economic importance.

Pigs from crosses of widely unrelated inbred lines have shown an increase in vitality and in rate of growth, but the degree of improvement has varied for the different crosses. In tests at the Iowa Experiment Station, one of the cooperating stations, 60 litters of these crossline pigs excelled uncrossed purebreds, sired by the same boars, in size of litters, gains in weight, and survival of pigs.

A new system of selecting pigs for breeding has been evolved at the regional laboratory. It is designed to speed up herd improvement and increase efficiency in pork production. The studies have shown that, in selecting young pigs for a breeding herd, from 8 to 10 times as many boars and about 3 times as many gilts as will finally be needed for breeding should be retained after weaning. They should be kept long enough before final culling is done to enable the breeder to obtain a measure of their growth rate up to 5 or 6 months of age. Final selection for the breeding herd should be made when the pigs are of that

age rather than at weaning time. The new method increases progress in herd improvement 50 percent or more.

Over a period of years the merits of various types of hogs have been at controversial question and preferences have swung from one type of another. An 8-year study has shown that from the standpoint of best interests of swine producers hogs of intermediate type are in general superior to small or large-type animals.

Breeding Improved Sheep

Scientists of the Department have cooperated with State livestock specialists and breeders in developing sheep better adapted to the rapid pace of modern production. The purpose has been to combine a maximum of desired characteristics. The scientists analyzed the breeding and production records of 1,622 ewes and their yearling daughters. Then they calculated the extent to which fleece and body characteristics are inherited.

The approximate degrees of heritability were found to be: Body weight, 40 percent; folds on the neck, 26 percent; length of staple (unstretched wool fibers), 36 percent; covering of wool on the face, 32 percent; weight of clean fleece, 38 percent; body type, 12 percent. It was evident from these figures that considerable progress in sheep improvement could be expected through selection for desired characteristics.

Studies of sheep on the western ranges showed great variation in the quantities of wool on the face and legs, and also in the prevalence of skin folds, especially about the neck and shoulders. Many sheepmen formerly believed that an abundance of wool on the face and legs of sheep and a wrinkled skin helped to make heavier and more valuable fleeces. Actual tests, combined with marketing data, showed the opposite to be the case. Wool on the face and legs was so often short, stained, and dirty that it was a liability. Moreover, a heavy face covering created a so-called wool-blind condition which handicapped the sheep in finding feed. A wrinkled skin seldom produced more wool, and it made shearing more difficult.

The investigators endeavored to remodel the sheep of selected flocks virtually from head to foot. They found that ewes with open faces raised more and heavier lambs than ewes with covered faces. Selective breeding increased the percentage of lambs with open faces and with relative freedom from skin folds. These findings have been disseminated among owners of range flocks.

The Columbia sheep, now recognized as a breed, has resulted from research work of this type. This new animal is primarily adapted to the intermountain ranges of the West. Because of its excellent fleece and meat, the Columbia has an earning power estimated to be $1 to $2 a head greater than that of average well-bred range sheep. It is the result of the cross breeding of selected Lincoln rams with Rambouillet ewes, followed by the mating of the most select first-cross rams with carefully chosen first-cross ewes, and finally by the interbreeding of the rams and ewes thus obtained. A recently formed association of breeders maintains registration records for this new breed and otherwise furthers its development.

More Beef From Phosphorus-Deficient Areas

Among its studies of animal nutrition, the Department has investigated mineral deficiencies in vegetation. These studies, conducted cooperatively since 1937 with the Texas Agricultural Experiment Station and the King Ranch, in southern Texas, have showed a definite phosphorus deficiency in the native vegetation of the Gulf coast area. To determine the effect on beef production, the investigators fed supplemental phosphorus in the form of bonemeal and disodium phosphate to both dry and lactating cows. The tests showed that phosphorus-deficiency diseases existed, but could be prevented or, in early cases, corrected by the feeding of supplemental phosphorus.

In herds that received this treatment the calf crop was increased nearly a third. Moreover, the calves were nearly 70 pounds heavier at weaning than in herds that received no phosphorus except that which occurred in the vegetation. The average financial benefit above the cost of the phosphorus supplement was $5.78 per calf.

To develop labor-saving methods of feeding phosphorus to cattle under range conditions, experiments were conducted in which the supplement was supplied in self-feeders, in the drinking water, and through the fertilization of pastures. The last method gave the best results, but all supplement-fed groups showed benefit from the treatment, as in the previous experiments. The results are applicable to some 15,000,000 head of cattle raised in areas of phosphorus deficiency in the United States.

Research Aids Poultrymen to Meet Production Goals

As an example of the need for wartime adjustments in poultry production practices, it may be observed that a list of poultry feedstuffs which the war has made scarce is similar to the list of ingredients in a good pre-war feed. Changes in poultry feeds, in other words, have been pronounced. Research in Department laboratories and in State experiment stations has resulted in formulas that include little or no meat or fish meal, but 20 to 30 percent of soybean meal. Fermentation solubles which formerly constituted a waste disposal problem have proved to be valuable feedstuffs and now supply an alternative source of important vitamins formerly obtained from dried-milk products. Corn and mill feeds have been found to be replaceable by other grains, and bonemeal by defluorinated phosphates developed by manufacturers and tested in the Department's laboratories and in the State experiment stations. Egg production per hen for the country as a whole has been maintained and even increased despite the need for changes in poultry diets.

Last year the poultry industry organized a National Poultry Advisory Council which is collaborating with Department veterinary officials and poultry specialties to reduce death losses in poultry. Response of poultry producers to its program, which emphasized proved methods of management and disease control, was excellent. More rigorous culling, practical sanitary measures, and improved management as advocated in the council's "Poultry Conservation for Victory Program," contributed to a substantial reduction in the death loss of layers, though poultry houses were more crowded than

usual. The percentage of death loss of layers, 16.2, was the lowest in 15 years.

National Poultry Improvement Plan

The quality of baby chicks produced by hatcheries has improved steadily since the establishment in 1935 of the National Poultry Improvement Plan. Average egg production per hen for the entire country, based on the number of layers on hand each month throughout the year, reached 142 in 1943, a gain of 8 in the last 4 years. Improved breeding-flock and hatchery methods, together with modern feeding, sanitary, and management practices, are chiefly responsible for the increase.

Preserving Poultry Feathers

Last year the Department announced a practical method of making downlike material from chicken and turkey feathers. The purpose was to supplement supplies of down needed for sleeping bags and comforts and coat linings. Complicating factors were that most chicken and turkey feathers are picked wet and that wet feathers spoil quickly. Study of this problem has developed an effective, cheap, and simple chemical solution for preserving wet feathers. With it, wet feathers can be preserved for several weeks—long enough to get them to processing plants in good condition. The preservative is prepared from salt and hydrochloric acid, used in the proportion of 15 pounds of common salt and 1 pint of concentrated hydrochloric acid dissolved in 30 gallons of water, for each 15 pounds of wet feathers. The solution costs initially only about 1¼ cents per pound of wet feathers treated and the expense is further reduced by the fact that the solution can be used over again for several lots of feathers before its preserving qualities are exhausted. The treatment does not injure the inherent fluffiness of the feathers. It makes possible the salvage for industrial use of millions of pounds of chicken feathers that formerly were wasted or used as low-grade fertilizer.

On Guard Against Infectious Diseases

The Department has maintained its customary quarantines and inspections to prevent the introduction of foot-and-mouth disease and other dangerous foreign infections. No such diseases have gained entrance to the United States in recent years—a circumstance that contributes immeasurably to the Nation's vast wartime production of meat and other livestock products. An outbreak of foot-and-mouth disease, in particular, would constitute a bad set-back to the food program.

Notable during the year was the suppression of a contagious vesicular disease that appeared in swine at a veterinary biological establishment in the Midwest. The malady, which proved to be vesicular stomatitis, has several symptoms that closely resemble those of foot-and-mouth disease. The first steps were to quarantine the premises and begin diagnostic tests by animal inoculations. Following the diagnosis of vesicular stomatitis, a number of animals on the premises were condemned. Certain others were later released for slaughter or

other disposal under restrictions. The premises were then disinfected, and susceptible animals were placed in pens as a means of determining whether all infection had been destroyed. The animals remained healthy. Only after all danger from infection was thus shown to be over was the quarantine lifted.

Holding Gains Against Bovine Tuberculosis

A small increase occurred during the year in the percentage of cattle reacting to officially supervised tests used in detecting and eradicating bovine tuberculosis. The increase was from 0.18 percent in 1943 to 0.20 in 1944. It was nevertheless a warning. Previously the trend in percentage of reactors was downward. Most cattle owners cooperate fully in the tuberculosis eradication project. They know what would follow were the disease to be reestablished in their herds or in their communities. Under present conditions, however, a shortage of veterinarians handicaps the eradication work. Hence the Department asks livestock owners to have cattle ready to be tested, and to provide suitable holding chutes for animals that are not accustomed to restraint, and to expedite tuberculin testing in other ways.

Vaccination Aids Brucellosis Control

Cattle owners are demanding more assistance in the eradication of brucellosis, or Bang's disease. Where the degree of infection is light, the elimination of reactors to the test for this disease continues to be a favored and practical method of suppressing it. In the more heavily infected areas, the proper use of *Brucella* vaccine, made from strain 19 of the organism, has been very helpful. Applied to calves from 4 to 8 months of age, it is a valuable supplementary measure. Since the adoption, January 1, 1941, of calfhood vaccination as a part of the official plan of combating brucellosis, about 771,000 calves have been vaccinated, half of this number during the last fiscal year. At the close of that period more than 17,000,000 cattle were under supervision for brucellosis eradication, with an additional million on the waiting list.

Better Control of Cattle Grubs

Research work on the control of cattle grubs has been greatly accelerated in the last 3 years and has produced several safe and effective treatments for the destruction of this pest. The treatments involve the use of derris powder or cube powder, in both of which rotenone is the active principle. The medicament can be used as a dip, a wash, or a spray under high pressure, but may be applied to the backs of cattle as a dust.

The wartime shortage of leather has been partly the result of the depredations of cattle grubs, which makes holes in the backs of cattle. This part of the hide provides the thickest leather. If not spoiled by grub holes, it is suitable for shoe soles, belts for driving machines, and many other important articles.

Approximately one out of every three cattle hides that reach the tanneries is classified as "grubby." This means that it has more than five grub holes. Besides spoiling hides, grubs cause a considerable loss of meat, because of the need to trim away the parts that the grubs

have injured. Such trimming removes an average of 2 pounds of meat per carcass and causes an estimated total loss of about 11,000,000 pounds of beef a year.

Phenothiazine Reduces Livestock Production Risks

Phenothiazine, one of the thiazine dyes, is now widely recognized throughout the world as a highly effective anthelmintic for the removal of many injurious parasites of domestic animals. Following the discovery of its value for this purpose by Department research workers in 1938–39, it has become well established as the most valuable single drug known for combating internal parasites. Nearly 3,000,000 pounds of it was used in the United States in 1943. Use of it in 1944 will probably be about 50 percent above that quantity. Besides removing several kinds of parasites from cattle, horses, mules, swine, sheep, and goats, this drug in very small doses removes cecal worms from poultry. These are the worms that transmit the serious disease blackhead to chickens and turkeys. Phenothiazine can be administered to sheep in their salt. This self-medication opens up the possibility of eradicating the stomach worm and the nodular worm, the two most serious worm parasites of sheep. The stomach worm is the principal enemy of the sheep industry the world over, and the nodular worm not only undermines the health of sheep but also spoils their intestines for catgut sutures and for sausage casings.

Cattle Liver Flukes Yield to Research

It has been estimated that about 3,500,000 pounds of beef and nearly 1,200,000 pounds of cattle and calf livers have been lost annually in recent years as a result of the ravages of liver flukes, which are flat, leaf-shaped parasites that live in the bile ducts of the liver. The loss of beef is due to both unthriftiness and deaths of fluke-infested cattle. Livers infested by these parasites are condemned in the course of meat inspection as unfit for human food or for making medicinal preparations used in treating pernicious anemia in man.

Research work by Department parasitologists has recently provided a highly effective treatment for the removal of these parasites from their host animals. The medication, which is used as a drench, is an aqueous suspension consisting of carbon trichloride (hexachlorethane), a clay-like substance called bentonite, and white flour. During the fiscal year 1944, Department representatives used this method in treating more than 4,000 head of cattle for the removal of liver flukes under cooperative agreements with stockmen in the Gulf coast region. In addition, many stockmen there and elsewhere used it on their own initiative in treating large numbers of cattle.

SCIENCE EXPANDS FARM PRODUCT USES

Agricultural scientists have developed substitutes and replacements for many imports that were cut off by the war and have made discoveries that are expanding the outlets and markets for agricultural commodities. Some of these developments will help civilians long after the war is over.

The Bureau of Agricultural and Industrial Chemistry has centered its work around wartime research. Approximately eleven hundred persons, more than half of whom are chemists, physicists, engineers, and other scientists, are conducting research in the Bureau's laboratories on more than 160 projects, which deal with the use of agricultural products in the war effort. The projects include work on penicillin, essential drying oils, automobile tire cord, rubber, industrial alcohol, smokeless powder, plastics, industrial proteins, synthetic fibers, rotproofing of sandbag material, preservation of vegetables by salting and freezing, dehydration of food and feed, conservation of leather, substitutes for cork, substitutes for palm and other industrial oils, and substitutes for other important products.

Notable among the Bureau's contributions to the war effort is the part it has played in the development of the new drug penicillin, which is produced by a mold. The Bureau's scientists have increased the yield of penicillin from a point at which the drug was only a laboratory curiosity to a point that justifies extensive commercial-scale production of it. Approximately 75 percent of the penicillin now being produced is made by a mold that was developed in the Bureau's Northern Regional Research Laboratory at Peoria, Ill. By selecting better strains of molds, and by feeding them on a new diet composed of corn-steeping liquor and milk sugar, two agricultural materials produced in abundance in this country, scientists at this laboratory increased the yield of penicillin more than 100 times. This new diet for the penicillin-producing mold, which incidentally has more than doubled the outlet for milk sugar, has made penicillin available to our armed forces much sooner than would otherwise have been possible. Some 21 plants in this country and Canada now produce it on a commercial scale. By the end of this year these plants will be turning out enough to treat 250,000 serious cases of infection a month.

Research in Food Preservation

Research at the Western Regional Research Laboratory at Albany, Calif., on the dehydration of foods, particularly vegetables, was valuable in the war effort from the start. With submarine sinkings heavy and shipping space limited, it was necessary to reduce both the bulk and weight of the products we shipped abroad. Dehydration of foods by improved methods was a principal means of economizing shipping space. Accordingly, the Western Regional Laboratory devoted one-third of its facilities to dehydration research. Through pilot-plant experimentation it obtained semicommercial answers quickly to a number of important problems. Partly on this technological foundation, industry was soon turning out large quantities of dehydrated foods for the armed forces and for shipment to our allies. In 1943, for example, it produced more than 500,000,000 pounds of dehydrated food, much of it according to methods worked out in the California Laboratory.

Apple sirup, which can be made from sound but off-grade apples, is being produced commercially in six or more plants in the United States and Canada as a result of wartime research in the Bureau's Eastern Regional Research Laboratory at Philadelphia, Pa. The product can also be obtained from apple cores and peels from canning

and dehydration plants. Apple sirup, besides being a food, is a good substitute for glycerine, which is needed in making explosives, and in certain industrial uses, such as cigarette making.

Refinement of a sweetpotato starch manufacturing process, which had been developed by the Bureau in previous years, took shape through the solution, at the Southern Regional Laboratory, at New Orleans, of a complicated problem of blending different batches of starch into a uniform product. The investigators designed and installed a special blending plant at Laurel, Miss., in 1941, and it has been in successful operation since. On the basis of results at this plant and related research by the Bureau, a large sugar corporation is constructing in Florida a sweetpotato starch plant which will have a capacity of about 50,000,000 pounds of starch per year. This plant will be large enough to produce much of the root starch we need, and that formerly we had to import. Also, the plant will provide a local market for sweetpotatoes.

Velva Fruit, a frozen dessert, is a wartime contribution that will probably be valued long after the war. Tree-ripened fruit, much of which is too soft for shipment, is the basis of the new product. Gathered along with the other fruit during the harvesting season, and preserved by freezing until it can be processed, the ripe fruit after being thawed out is made into a puree and then refrozen. In this form it contains the original flavor, color, and nutritive value.

New Uses for Farm Byproducts

Noreseal, a cork substitute, is a wartime product of research in the Bureau of Agricultural and Industrial Chemistry. It can be made from farm wastes such as peanut hulls, cornstalks, sugarcane bagasse, and similar pithy material, in rod or sheet form, or for pouring directly into the cap of the bottle. It is useful as a seal for bottled beverages. Noreseal is now in pilot-plant production and may develop into a permanent successful enterprise.

Rutin, a valuable glucoside effective in treating conditions associated with high blood pressure, has been extracted from bright or flue-cured tobacco by the Bureau's scientists. This new medicinal agent is found in the leaf of the tobacco; the quantity obtainable varies with the quality of the leaf and probably with its age.

As a result of research in the Bureau's Citrus Products Laboratory, at Winter Haven, Fla., crude citrus pectin can now be made at low processing cost from grapefruit-cannery waste. The crude pectin, or refined pomace, is produced by leaching, drying, and grinding treated grapefruit peel. Grapefruit-cannery residue contains from 2½ to 4 percent of pectin. During the 1942–43 season Florida canners processed more than 17 million boxes of grapefruit, and had left more than 322,000 tons of peel and pulp. Less than 60 percent of this waste found a commercial use. The rest was dumped on pastures, groves, and wasteland. Such raw material can now be used for making either crude or refined pectin. One commercial plant, erected to apply the Bureau's findings, is already in operation.

A simple, inexpensive method for removing nightshade berries from commercial canning peas, heretofore a hand-labor job, has been

worked out by the Bureau, in cooperation with the Washington Agricultural Experiment Station and the Washington-Oregon Canners Association. It is an emulsion of light oil, which permits the nightshade berries—which are hard to distinguish from small peas—to float away while the peas settle. Tried last year on a pilot-plant scale, the method will be tried this year by a number of plants on a commercial scale.

Starch From Wheat

Two processes have been developed for the production of starch from wheat. In one of these whole wheat is the raw material which is processed in the same equipment as that used in the wet-milling of corn. In the other process wheat flour is used. This method is adaptable to equipment used in beet-sugar plants. Very little new equipment is required in either case. Either process will produce starch suitable for conversion to glucose sirups. In both cases gluten can be recovered for use as a high-protein feed. In the flour process the gluten recovered is sufficiently pure for use in the production of glutamic acid, greatly needed now in the Nation's food program. These two new developments are particularly timely in view of the shortage of starch, sweetening agents, and high-protein feeds.

The promising tung oil industry in this country now has available a continuous solvent extraction process, worked out in the Bureau's Tung Oil Laboratories at Gainesville, Fla., and Bogalusa, La. By this method, approximately 98 percent of the oil can be recovered from the tung fruit, as compared with about 84 percent by the method generally used. Tested and found to work satisfactorily on a pilot-plant scale, the new process is to be tried on a commercial scale.

An important research project in the New Orleans Laboratory looks toward the development of an improved cotton tire cord. About 8 percent of the cotton normally consumed in this country goes into the manufacture of automobile tires. Any development that will increase this amount may consequently be a help to the cotton industry. In an elaborate and exhaustive program, which involves many cotton varieties, road tests have demonstrated that cotton cords definitely superior to those now in use can be produced.

Ground Corncobs for Cleaning Engines

Certain delicate and important parts of naval aircraft engines are being cleaned rapidly and successfully by a ground-corncob material. It was developed by the Bureau in cooperation with the Navy as an emergency wartime project. Scientists in the Bureau found that corncobs, when ground so as to pass through a 16-mesh screen and used in ordinary sandblasting guns with openings of three-sixteenths of an inch, would remove organic and softer mineral deposits with no appreciable wear on the metal parts. This new product is now in commercial production, and the entire output is going to the Navy. It may provide the basis for a small post-war business in cleaning automobile and airplane engines.

DEHYDRATION OF FOOD

The primary wartime advantage of dehydrated food is that it saves space and weight in shipping. Other advantages are a saving of metal for containers and preservation of food without refrigeration. Millions of pounds of dehydrated vegetables, fruits, eggs, milk, and meat have been shipped to our armed forces and allies since 1941. An idea of the space saved in transporting this food may be gained from the following figures: Reduction in weight of vegetables allocated by the War Food Administration for dehydration in the fiscal year 1943–44, approximately 87 percent, or 1,200,000 tons; reduction in volume, about 70 percent, or 50,500,000 cubic feet, equivalent to 1,260,000 ship's tons.

Vegetable Dehydration

Building on research performed during and after World War I, when dried vegetables proved a failure, research workers, since 1941, have been seeking methods of improving dehydrated products. As a result, optimum blanching conditions have been established for many vegetables. Control of drying time and temperature, proper packaging, and methods of handling and storing products have been shown to be important factors. Packing of certain vegetables in an inert gas (one which contains little or no free oxygen) has been adopted to prevent the deteriorating effect of oxidation and thus lengthen storage life. Drying to a moisture content of 2 to 7 percent—much lower than had been attempted before—has greatly improved keeping quality. A manual for operators of dehydration plants, giving engineering and operating details, has recently been published by the Department as Miscellaneous Publication 540, Vegetable and Fruit Dehydration.

In recent research, emphasis has been placed on compression of dehydrated foods and on factors affecting retention of quality in the finished product, such as control of raw materials and storage conditions. Producers, Government purchasing agencies, and research organizations are working together toward these objectives. During the past year, research workers in the Western Regional Research Laboratory, where the vegetable and fruit dehydration work of the Department is centered, have shown that most of the commonly dehydrated vegetables can be compressed into blocks or cakes without damage to quality. Compression would cut the cargo space required for dried vegetables by approximately half, but it is not yet a commercial practice.

A recent development that has been investigated and applied commercially is the treatment of cabbage with a sulfite solution before drying. This has been found to result in better preservation of vitamin C, color, and palatability. The possible value of sulfite treatment for carrots and potatoes is being studied.

Dehydrating whole eggs has largely supplanted the drying of yolks and whites separately as the result of development of improved processes for drying them together. Supplementary drying to a very low moisture content appears to be a promising means of increasing the shelf life of whole-egg powders. Most of the wartime increase in production of dehydrated eggs has been in whole eggs, production of

which jumped from 179,000 pounds in 1938 to 226,127,000 pounds in 1942.

Dehydrated Meat

Research on the dehydration of meat conducted by four bureaus of the Agricultural Research Administration at the Beltsville Research Center and several outside agencies has sought to process pork, beef, lamb, and mutton in such a way as to give it maximum palatability, keeping quality, and nutritive value. The results achieved have aided the meat industry in producing a large volume of dehydrated meat of the precooked type for filling lend-lease and military needs.

On the basis of boned, trimmed fresh meat, dehydration saves approximately 60 to 70 percent in weight and reduces the volume 65 to 75 percent. When packed in hermetically sealed cans, properly processed dehydrated meat keeps well without refrigeration.

Recent developments in this field point to the desirability and practicality of drying raw meat at moderately low temperatures so that it is not cooked until it is finally prepared for eating. Most present methods of dehydration involve cooking the meat before and during the drying process, which assures good keeping quality but impairs palatability. The key to the problem of producing dehydrated raw meat that will keep well is believed to be a very low moisture content—probably not more than 2 percent, in contrast to about 8 to 10 percent in precooked dehydrated meat. Experimental lots of meat dried at a low temperature to this low moisture content retained the desirable qualities of color, texture, and flavor found in high-quality fresh meat, and packed in vacuum-sealed cans kept well for over 7 months at temperatures up to 70° F.

Post-War Possibilities

In spite of the advances in dehydration technique that have been made during the war years, research to effect further improvements should not stop with the war. At present practically the entire output of the dehydration plants is contracted for in advance by Government agencies purchasing for the armed services and lend-lease. When the war is over there will undoubtedly be a need for dehydrated foods for some time in connection with relief and rehabilitation activities, but eventually the industry must depend largely on the domestic market. Consumer acceptance of dehydrated foods will depend largely on three factors—palatability, convenience of preparation, and price—all of them dependent, in the final analysis, on research.

After the war an active, prosperous dehydration industry will have value as a national security measure. Our experience in this war shows that a sudden expansion of a dormant industry in an emergency, though it may be successfully accomplished, is difficult and wasteful of time and materials. A nucleus of the industry, which would keep methods and equipment up-to-date and retain trained personnel, could be easily expanded in case of a national emergency.

Dehydration is also promising as a means of preserving seasonal surpluses of foods. Under cool dry storage conditions dehydrated vegetables will keep for 2 or more years, and dehydrated meat of the precooked type, packed in metal containers, keeps satisfactorily for

at least a year. Surpluses thus preserved could be marketed later in an orderly manner.

RESEARCH PROMOTES DAIRY PRODUCT CONSUMPTION

The dairy industry's big task in the post-war period will be largely to find ways of promoting increased domestic consumption of dairy products, so as to absorb dairy production that now goes into lend-lease channels and into stock piles for military purposes. There is an opportunity for a considerable increase. Education of consumers as to their nutritive needs for milk and other dairy products has caused many to seek more than they can get, under present conditions. If this increased desire for dairy products can be maintained, both the dairy industry and the Nation's nutrition will benefit.

The extent to which domestic consumption can be increased will depend primarily, of course, on the purchasing power of the people. It will depend also, however, on the quality, palatability, and healthfulness of the dairy products offered for consumption. The flavor and wholesomeness of dairy products have much to do with the amounts consumed. Greater efficiency in production, processing, and distribution, besides enabling the industry to lower its costs, will also make dairy products better and more desirable.

Producing uniformly high-grade creamery butter requires the production of high-quality milk or cream on the farm, and the delivery of it in good condition to the creamery. Research has indicated proper methods of production, and extension work has made these methods known to progressive dairy farmers. But they need to be adopted more generally. It is important, for example, to develop more widely the practice of making daily deliveries of fresh whole milk to the creamery. This is better than the infrequent delivery of cream because it gives the butter manufacturer a better quality of raw material.

The delivery of whole milk, which began a decade or more ago with the vigorous encouragement of dairy research men, has increased markedly during the war. The role of research in this development has included the discovery of wider uses for the nonfat solids of milk. For example, during World War I the Department developed and encouraged commercial methods of making cottage cheese. Subsequent research greatly increased the utilization of skim milk in bread and other bakery products, and found uses in ice cream for nonfat solids of milk. The use of nonfat solids in these products requires the delivery, of course, of whole milk. Such developments tend to improve the average grade of creamery butter throughout the country, as well as to provide food uses for the nonfat parts of milk. Hence continued efforts will be made to increase such market outlets.

Recently the Bureau of Dairy Industry developed necessary information for producing and packaging butter oil and whole milk powder of longer keeping quality. Improved quality in these products should further encourage their use in many ways and places, and extend the dairyman's market.

Improvements in Cheese Making

Manufacturers of Cheddar cheese have improved that commodity remarkably since the war began. The Government has demanded high-grade cheese, and Government research workers have aided factory operators to produce a higher percentage of the top grade. Pasteurization of the milk is an important new step in the procedure which manufacturers are adopting as rapidly as the availability of equipment will permit. Great importance attaches also to the quality of the milk delivered to the cheese makers. Typical of the improvement possible is that made by a number of factories in Minnesota. Adoption by these factories of the Bureau's method increased their output of No. 1 cheese from 36 percent in 1942 to 99 percent in 1943.

Investigations by the Bureau of Dairy Industry have resulted in the development of six different processes for recovering milk sugar from cheese whey. An important wartime use for milk sugar, which will probably continue in the post-war period, is as a food for growing the molds that yield penicillin. Much of the increase in milk sugar required during the last year was obtained from cheese whey rather than from casein whey, the principal previous source. All the new processes require but one crystallization, rather than several, and yield grades of milk sugar suitable for many uses.

Dairy-Herd Improvements

After the war most dairy farmers may need better cows rather than more cows. The 600,000 cows now in dairy herd improvement association herds are evidence that many dairymen are alive to this probability. Owners of these 600,000 cows endeavor systematically to apply the information that research develops in the breeding, feeding, and management of dairy animals. The association cows average about 8,300 pounds of milk per cow per year, as compared with an average of 4,600 pounds for the 25,500,000 cows milked in the United States last year. Cost records indicated that the association cows, with their average production of 8,300 pounds of milk, consumed only 99 cents worth of feed for each 100 pounds of milk they produced. The cows that averaged only 4,600 pounds consumed feed worth $1.32 for each 100 pounds of milk they produced. Every time one cow producing 8,300 pounds replaces two 4,600-pound cows on the average dairy farm, an important saving in feed, labor, and other costs results.

The dairy herd improvement association herds are the source of thousands of production records tabulated by the Bureau of Dairy Industry each year to find outstanding dairy sires, and the sons of such sires, for use in building up the milk-producing inheritance of the millions of dairy cattle outside the association program. To date more than 10,000 bulls in the association herds have been "proved" by the records of their daughters. On the average their daughters have produced 362 pounds of butterfat per cow per year, almost twice as much as the 182-pound average for all cows milked last year. Many of these good proved sires or their sons have been singled out for further service in cooperative bull associations, bull studs, and artificial breeding associations, where they can be expected to contribute further improvement because of the increased number of matings possible.

In the present stage of breeding progress, dairy farmers find it necessary each year to save and raise between 5,000,000 and 6,000,000 heifer calves for replacement purposes. Since nearly one-third of these heifers turn out to be unprofitable milk producers, the economic importance of being able to detect the inferior ones at an early age and save the expense of raising them is obvious. Studies begun by the Bureau of Dairy Industry a number of years ago now show promise of providing the dairyman with a method of examining the udders of heifer calves (by palpation) at 4 months of age to determine their future milk-producing possibilities. With a little practice almost any dairyman, who familiarizes himself with the exact stage and size of mammary-gland formation to be expected in 4-month-old calves, can sort the calves in his herd into three classes—good, medium, and poor.

PROBLEMS IN PERSONNEL ADMINISTRATION

The effectiveness of the Department's service to the Nation depends at all times and especially in wartime on efficient recruiting, placing, training, and utilization of employees. The Department has 60,000 full-time employees, about 10,000 of them stationed in Washington and the rest scattered through the United States and foreign countries. The staff is considerably smaller than before the war. These people represent all branches of science, various technical skills, numerous arts and crafts, and extensive administrative knowledge and experience. Proper utilization of their training, intelligence, energy, and initiative depends to a large extent, of course, on the coordination of their work in a consistent and smooth-running whole. This is largely a problem in personnel administration.

In major personnel matters the Office of Personnel has over-all responsibilities. This agency deals with the recruitment, classification, training, and discipline of the personnel, and endeavors to work out main policies and producers. It is not, however, a highly centralized authority. On the contrary, it cooperates with the various bureaus and offices in developing a wide delegation of responsibility. In the fiscal year 1944, for example, less than 8 percent of the appointments required prior approval by the Office of Personnel. Moreover, the system in use gives broad powers over position classification to the bureaus and offices. Such methods speed the work without impairing its basic uniformity.

In common with other large employing organizations, the Department has had new problems to cope with under war conditions. Primarily, of course, it has had to replace the men and women who have entered the war services. At the end of fiscal 1944 more than 16,000 of the Department's employees were on military furlough, and more than 8,000 on transfers to war agencies. These transferred employees have reemployment rights. In order to fill the gaps it was necessary, for one thing, to increase the percentage of women in the Department's personnel. Full-time female employees comprised 35.6 percent of the Department's personnel at the end of fiscal 1944, as compared with 31.2 percent in the previous year. Necessarily, also, the wartime personnel includes an increased proportion of inexperienced younger workers, of older workers, and of physically handicapped

persons. Yet training programs and improved coordination of work have maintained over-all efficiency at a very high level. Notable in producing this result has been Department-wide emphasis on the increased utilization of employees' skills, and on the training of employees for more difficult and more important tasks. Better training of supervisors has helped to compensate for the shortage of workers.

Problems Created by the War

In asking the deferment of employees from the draft, the Department has based all recommendations on individual case investigations. It has devoted intensive study also to the problem that will be created by the eventual reabsorption of employees now on military furlough or transferred to civilian war agencies. When the war is over, this will be a major personnel problem. Coping with it and with related reconversion problems will require thorough advance planning. Necessarily the task will come to a focus in the Office of Personnel. Along with many other readjustment problems, it received preliminary attention at a national meeting of representatives of Department personnel offices which was held in St. Louis in November 1943, and laid the basis for important general revisions in personnel policy. The Department has 30 bureaus, administrations, and offices whose personnel activities require intricate and continuous coordination, and how to improve this coordination is being studied intensively.

Experience with personnel problems under war conditions has drawn special attention to the individual problems of employees. It is not enough to have merely comprehensive policies. Also necessary is an adequate personnel-relations program, with facilities for employee counseling, employee services, and aids to the individual employee in adjusting himself to his job. An important additional need is a professionally directed health service. Legislation to provide such a service has been introduced in Congress. Main objectives are sickness prevention and elimination or control of accidents, and other hazards. The Department has long felt that a health program for its employees is a necessary counterpart of the placement, training, and advancement phases of the personnel work.

Basic in the personnel work is the idea that it should promote a mutuality of interests between the Department and the employees. Specifically, it should give the employees an opportunity to develop and use their abilities in healthful and comfortable surroundings, and should maintain fair conditions of pay, promotion, job allocation, and discipline. In return the Department may expect to get a high average output of high-quality work, through the maintenance of high morale among the employees accompanied by an increase in their skill. In these respects, despite the handicaps mentioned, the war period has been one of progress.

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